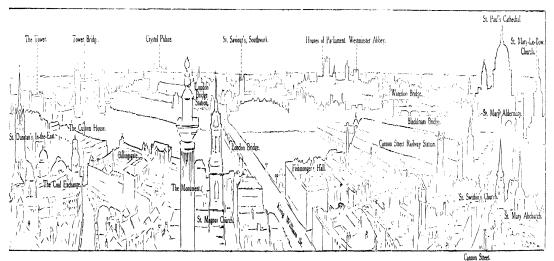


The Harmsworth Encyclopædia

Vol. VII. Log—Ordovician



PANORAMIC VIEW OF LONDON AND THE THAMES.



THE KEY.

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Vol. VII. Log Ordovician



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THE HARMSWORTH ENCYCLOPÆDIA.

An apparatus used to measure a ship's speed. In its simplest form, as invented about 1620, it consists of the log-ship, the log-line, the log-reel, and the log-glass. The log-ship is a flat wooden board, triangular in shape, and weighted so as to float perpendicularly, with holes at two corners, to one of which the log-line is made fast by passing through and knotting, and in the other of which is a bone peg attached by means of a span to the log-line. For ascertaining the speed of a ship, the log-ship at the end of the line is thrown overboard astern, and the line is paid out from the log-reel. The line is marked at certain intervals, and a sand-glass is turned over so as to begin running exactly when the line does. The log-line is marked off in lengths of 47 ft. 3 in. when a 28-seconds sand-glass is used, which is usual. The lengths between the marks are determined from the fact that 47 ft. 3 in. bear the same proportion to a nautical mile as 28 seconds do to 1 hour. The first 10 fathoms or so of the line are 'stray line,' the allowance made for carrying the log, when it is heaved, away from the influence of the ship's wake.

A log was patented by Edward Massey of Hanley, Staffordshire, in 1834, for registering the speed of ships by a mechanism which was towed from the quarter, with line enough to clear the eddy in the wake of the ship, showing the distance actually gone through the water, by means of the revolutions of a fly-wheel, and register-ing upon a dial plate the knots ing upon a dian phase the knows and tenths. Massey's original log was quickly improved by him and by others, especially by Walker. The 'Cherub' log, largely used in the navy, is of this type. See

Log-Book, the official journal of all important occurrences in and in connection with a ship. A log-book is usually kept upon

printed forms, which are bound up together, containing ruled columns in which are entered the date, the nature and force of the wind, the state of the weather, wind, the state of the weather, the course, the currents encountered, the progress made, the performances of the engines, the state of the thermometer and barometer, the observed latitude and longitude, bearings and distances, and other particulars, together with remarks as to work gether with remarks as to work done on board, places visited, punishments inflicted, drills carried out, health of the ship, and signals made and exchanged. The official ship's log is kept by the navigating officer in charge, and is initialed by the officer on watch. In addition to the ship's log-book, an engine-room register has to be kept by the engineer officer, and a gunnery log by the gunnery officer.

Logan, city, Utah, U.S.A., the co. seat of Cache co., on Logan R., in a rich mining and agricultural region. Industries: sawmills and beet-sugar factories. Pop. (1900) 5,451.

togan, Mount, peak (19,514 ft.) in the s.w. corner of the Yukon territory, close to the Alaskan boundary and N. of Mt.

St. Elias. It is the second highest peak in N. America. Logan, JOHN (1748 88), Scot-Logan, John (1748 88), Scottish divine and poet, born in Fala parish, Midlothian; studied at Edinburgh University, and became collegiate minister of S. Leith (1773). Constrained by dissipation to resign his pastoral charge (1786), he retired on a small annuity and settling in small annuity, and, settling in London, contributed to the English Review, and did miscellaneous literary work. In 1770 Logan edited a volume of poems by his deceased fellow-student, Michael Bruce, inserting extraneous mat-ter and taking other liberties, which were keenly resented by Bruce's friends. In 1781 a volume of his own poems was issued containing various pieces claimed

for Bruce, and especially a modified recast of the exquisite Ode to the Cuckoo included in the book of 1770. He published a View of Ancient History (1788-93), a Re-view of the Principal Charges against Warren Hastings (1788), and two volumes of his Sermons (1790-1). The Visit to the Country in Autumn and the fine ballad Braes of Yarrow have undeniable claims to recognition for their poetical merit. See Memoir prefixed to his Sermons (1810), Anderson's British Poets (1795), and derson's British Poets (1795), and Maelagan's Scottish Paraphrases (1889). The Bruce-Logan controversy has produced a large amount of literature on the subject of the cuttories. ject of the authorship of Ode to the Cuckoo. See British and Foreign Evangelical Review, 1877 and

Logan, JOHN ALEXANDER (1826 86), American politician and soldier, born in Jackson co., Illinois; served in the Mexican war, and after its close studied at the bar. A member of Congress (1858-61), he joined the army of the North, and commanded with especial distinction till the end of the war. Re-entering Congress (1866), he became a senator (1871), being re-elected (1879 and 1885). In 1884 he was nominated as Re-publican candidate for the vicepublican candidate for the vice-presidency, but was defeated. Logan was author of *The Vireat* Conspiracy (1886) and *The Volun-*ter Soldier of America (1888). See Life by Dawson (1887). Logan, SIR WILLIAM EDMOND (1798-1875), Canadian geologist, born at Montreal educated at

born at Montreal; educated at Edinburgh High School, and, after being engaged in a mer-cantile house in London and copper-smelting works at Swansca (where he prepared maps of the Welsh coal basins), was placed at the head of the projected geo-logical survey of Canada (1842), a post which he held till 1871. His so-called fossil, Eozoon canadense, discovered during this period.

gave rise to considerable controversy as to its organic or in-organic origin. He published his Geology of Canada (1863). Life by Harrington (1883).

Logania, a genus of Austra-lasian and New Zealand shrubs, order Loganiace:e, characterized by opposite, entire leaves, and by white or pale bell-shaped flowers, usually borne in cymes. In this country they are cultivated in sandy peat under glass.

Logansport, city, Indiana, U.S.A., the co. seat of Cass co., on the Wabash R., 115 m. S.E. of Chicago. It has good water power, and manufactures automobiles, carriages, water-wheels, and foundry products. Pop. (1900)

Logarithms are numbers related to the natural numbers in such a way as to enable us to substitute addition for multiplication and subtraction for division. Their invention (by Napier of Merchiston, 1614) constituted one of the most fruitful advances ever made in practical mathematics. The principle of the method is contained in the algebraic law of indices, which asserts that $a^x \times a^y = a^{x+y}$. If we put $a^x = m$ and $a^y = n$, the quantities x and y are the logarithms of the numbers m and n respectively to base a. If we represent m by its logarithm x, and n by its logarithm y, then the product mn will be represented by the sum x + y, and the ratio m/n by the difference x-y. Any number may be taken as base, but practically by far the most convenient base is 10. To this base the logarithm of 10 is 1; of 100, 2; of 1,000, 3; and so on, as indicated in the following table :-

_	
Number.	Logarithn
1	0
10	1
100	2
1,000	3
10,000	4
100,00 0	5
1,000,000	6
10,000,000	7
100,000,000	8

Evidently all numbers between 1 and 10 will have logarithms between 0 and 1, numbers between 10 and 100 will have logarithms between 1 and 2, and so on for all sets of numbers intermediate to successive powers of 10. For example, the logarithm of 2 is (to five figures) 0'30103. Since 20 is 10 times 2, the log. of 20 will be the sum of the logs. of 2 and 10—i.e. 1 30103. Similarly, log. 200 = 2 30103, log. 2000 = 3 30103, and so on. It is this property of the logarithms to base 10 which gives the system such a great advantage over systems to other bases. The fractional part of the logarithm is the same for the same succession of figures, quite independent of the position of the decimal point. The decimal point determines between which two powers of 10 the number lies, and the number which precedes the fractional part of the logarithm is known at once by mere inspection. For practical use it is convenient to tabulate the logarithms of all successive numbers to, say, five significant figures. By simple processes of interpolation it is easy to calculate from these the logarithms of numbers given to six or seven significant figures. For most practical purposes, seven-place logarithms are too accurate; six-place logarithms, or even five-place logarithms, are amply sufficient for nearly all purposes; and for many practical uses four-figure tables will suffice.

To facilitate trigonometrical calculations, it is usual to tabulate the logarithms of the circular

functions of angles.

Logarithms to base 10 are usually called common logarithms, or Briggsian logarithms, after Briggs, who continued Napier's work by constructing the first table of logarithms to base 10. But once logarithms have been calculated to any one base, they can be obtained to any other base can be obtained to any other base by multiplying by the appro-priate factor throughout. For if $n = a^y = 10^x$, we find at once $x \log_1 10 = y \log_1 a$; and hence y is found from x by divid-ing by the logarithm of a to base 10. Now it may be shown

that $a = N \left(1 + y + \frac{1}{2}y^2 + \frac{1}{2} \cdot 3^{y^3}\right)$ $+\frac{1}{2.3.4}y^4 + \text{etc.}$); and if we choose

a such that N=1, we find for its value the converging series $e=1+1+\frac{1}{2}+\frac{1}{2.3}+\frac{1}{2.3.4}+\frac{1}{2.3.4}+\frac{1}{2.3.4.5}$

 $+ \dots = 2.7182818\dots$ It is this the natural, hyperbolic, or Napierian logarithms.

In all systems of logarithms the logarithm of unity is zero; hence the logarithms of proper fractions must be less than zero-i.c. they must be negative quantities. For example, the common logarithm of 0.2 is $\log 2 - \log 10 = 0.30103 - 1 = -0.69897$. It is usual, however, to keep the expression in the form first given—viz. - 1 30103, in which it is understood that the fractional part is positive. is almost universally written in the more concise form $\bar{1}$ 30103, in which the negative sign is represented by a short stroke over the characteristic or number before the decimal point.

The logarithmic curve is a curve whose one co-ordinate is the logarithm of the other co-ordinate. Its equation may be written in the form $y = \log_{+}(x/a)$. The $\log_{+}a$ rithmic spiral is represented by a similar equation between θ and rviz. $\theta/\alpha = \log (r/a)$. The logarithmic spiral is also known as the equiangular spiral, because of the property that all radii rectores drawn from the pole cut the curve at the same angle for any one given curve.

Logau, FRIEDRICH, FREIHERR von (1604-55), German poet, studied law at Frankfurt-on-the-Oder, and entered the service of the Duke of Liegnitz. The prevailing note of bitterness pervading his epigrammatic and satirical verse was doubtless deepened by public and private vicissitude. A selection made by Ramler and Lessing from Logau's Sinngedichte appeared in 1759; while a later selection from his poems, with biographical notice (1870), was followed by a complete edition, edited by Eitner (1872).

Loggia, the Italian name for galleries and verandas roofed over, but open on at least one side to the air. In Italy the name is also given to the numerous areades and porches of public buildings—c.y. those of the Vatican, decorated by Ra-

phael and his pupils.

Logia, a Greek word (pl.) meaning 'oracles,' and often applied by Biblical scholars to a supposed collection of the agrapha, or 'sayings,' of Jesus. Papias, who lived in the first half of the 2nd century A.D., asserts that Matthew words a asserts that Matthew wrote a book of logia in Hebrew (i.e. Aramaic); but it is generally Aramaic); but it is general, agreed that this cannot have been the canonical Matthew, which is an original, not a translated, work. The statetranslated, work. The statement of Papias, however, has been of the highest service in pointing to a possible solution of the synoptic problem (see Gos-PELS), as it indicates the existence of a collection of our Lord's utterances, which forms one of the sources of the 'two-document theory,' the other being the narrative of Mark, and which, existing in various forms, has been incorporated in our Matthew and Luke. That such books of logia were actually compiled is demonstrated by the discovery, at Oxyrhynchus in Egypt, of two collections of such sayings, each beginning with the words 'Jesus said,' published by Grenfell and Hunt (1897 and 1904).

Logic as the systematic study of reasoning or thought was created by Aristotle. His logical system is embodied in a number of writings collectively known as the Organon (see ARISTOTLE), and of these the three most important -viz. the Prior and Posterior

Analytics and the Topics-belong closely together. They contain his theories of the syllogism, of scientific proof, of definition, of induction, and of probable reasoning, and together constitute a single and connected, though complex, investigation of scientific method and procedure. For Aristotle, logic was, in fact, the general theory of scientific method. His theory of syllogism is the central portion of his whole investigation, and constitutes in his view an analysis of the structure of all demonstration and proof. In every syllogism we proof. have the two terms which are connected in the conclusion, and middle term through which the connection is established. And the connection of the two extremes in the conclusion is affirmed in virtue of their clearly perceived relationship through or within the middle term, which relationship is explicitly set forth in the premises of the syllogism. Thus, when we want in geometry to prove that the sum of the three angles of a triangle is equal to two right angles, we do so by showing that the sum of the three angles of a triangle is equal to the sum of any one angle and the adjacent exterior angle, and this latter sum we already know to be equal to two right angles. Here, then, we use the more general or clementary principle regarding the sum of the angles made by the junction of two lines (two sides of the triangle) to prove the required property of the triangle. And it is clear that the whole chain of demonstrations in which geometry consists may thus be resolved into a series of reasonings of whose essential structure the syllogism is an analysis. In Aristotle's view the essential nature of scientific proof consists in the deductive process by which we pass from universal principles to their necessary consequences. And such proof within any one science therefore depends in the last resort upon those fundamental or ultimate principles, which are assumed as the basis of all our demonstrations in that science, and which cannot themselves be demonstrated in deductive fashion. Such principles are arrived at inductively i.e. they are suggested by an examination of instances. But this sort of suggestion is not strictly proof, and induction is thus subsidiary or preparatory to the deductive process of science proper.

The history of the Aristotelian logic has been largely a history of degeneration, and for this degeneration the mediaval scholastic logicians were chiefly responsible. To Aristotle the syllogism was the instrument or method of science; to the scho-

lastic theologians it was a method of expounding the dogmas of the church, and of expanding these into all their remoter consequences and details.

In view of this degradation of the syllogistic logic to a mere formal method of disputation, it is not surprising that thinkers of the modern period, like Bacon and Locke, imbued with the new scientific spirit, should have conceived a strong distaste for such a logic, at any rate as a method of science. This antagonism of the empirical school was not lessened when, later in the modern period, a purely formal conception of logic was expressly put forward and defended on the basis of a rigid distinction between the form and the matter of thought by logicians under the influence of Kant. Such a type of logic was represented in this country by Hamilton and Mansel. J. S. Mill, on the other hand, the contemporary representative of the empirical school, upheld their traditional view by attacking the syllogism as a petitio principii, and developing his own analysis of the inductive methods of scientific proof as a real logic of investigation—a logic of truth as opposed to a mere logic of con-And accordingly, in sistency. several of our most popular and widely used text-books, written under the influence of Mill's great work, we find a sharp division made between deductive and inductive logic-the former dealing with the merely formal manipulation of propositions and reasonings, the latter with the real processes of scientific inference.

But from this condition of things modern logic has tended, and more especially within recent years, to diverge in two opposite directions. The purely formal logic of the formal logicians has given rise to a still more extreme symbolic logic, which attempts to express the processes of thinking by mathematical methods and formulæ. (See Venn's Symbolic Logic, 2nd ed. 1894.) And, on the other hand, philosophical logicians have, in a manner, returned to the genuine Aristotelian standpoint, and, treating logic as the theory of knowledge or science, have re-vindicated for deduction its true place in logical theory. The abstract separation of the form from the matter of thought has been rejected, and a more real interpretation of deductive method has been made possible; while induction is seen, when rightly interpreted, to be simply the inverse process of deduction. (See INDUCTION.) This more philosophical type of logic was revived in this country by Bradley's

Principles of Logic (1883), a keen criticism of current logical theories, which was followed up by the masterly constructive work of Bosanquet (Logic, 2 vols. 1888). The translated logics of Lotze and Sigwart have contributed powerfully to the same general tendency to treat logic as a theory of knowledge and scientific method. From such a standpoint logic and epistemology become identical, and no hard and fast line can be drawn between logic and metaphysics. (See Philosophy.) The revival of philosophical logic in England was due to the influence of German post-Kantian idealism, and partakes of the metaphysical character of the latter; but quite apart from this influence, other important contributions have been made, which are in line with Mill in bringing logic into close relation with science. Of these, Venn's Empirical Logic (1889) may be said to be a very valuable revision of Mill, while Jevon's Printer of Mill, while Printer of Mill, while Printer of Mill, while Printer of Mill, while P ciples of Science (2nd ed. 1877) combines the scientific standpoint with symbolic methods. The best recent work on the lines of the older formal logic is Keynes's Formal Logic (3rd ed. 1894).

Logogram, a form of puzzle in which, a word having been selected (as, for example, 'mate'), as many anagrams as possible are formed from it ('team,' meat,' 'tame'). These anagrams themselves are not mentioned; but in the verses which form the puzzle either their synonyms (e.g., 'yoke,' 'food,' 'domesticated') or a description of them is contained. Tho reader is required from this to guess the original word. See ANAGRAM; also Wheatley's Auagrams (1862).

Logos, a term applied in the prologue of John's Gospel to Jesus Christ (John 1:1, 'the Word'). It has affinities with the Hebrew 'Wisdom' (see Prov. 8, especially ver. 22-30; ef. Wisdom of Solomon 7:25 f.), and also with the Mēmra (i.e., word) which in the Jewish Targums ranks as the agent of God in creation. The decisive step of identifying the Logos not only with the Messiah, but with an actual person, Jesus Christ, was taken by St. John. See Liddon's Bampton Lectures (1866), Heinze's Die Lehre vom Logos in der Gr. Phil. (1872), Drummond's Philo Judeus (1888), and Réville's La Doctrine du Logos (1881).

Logrono. (i.) Inland prov. of N. Spain, consisting of a mountainous district s. of river Ebro. Area, 1,945 sq. m. It produces cereals, but is specially famous for its red wines. Pop. 186,223. (2.) (Anc. Lucronius), walled tn. and cap. of above prov., on the Ebro, 30 m. s.e. of Vitoria; is

the centre of the Rioja wine district. Pop. (1901) 18,866.

Logwood is obtained from the

Logwood is obtained from the logwood tree (Harmatoxylon campechianum), which is indigenous to Central America. The heartwood is imported, and is cut into chips, heaped together, moistened, and exposed to the air, when a process of fermentation takes place, which darkens the wood and gives it a beetle-green lustre, due to the formation of a colouring matter, hæmatein, which can be extracted by hot water. Logwood is largely used as a red dye, in the manufacture of inks, and as an astringent to control diarrhea. See Dyeing.

Lohardaga, cap. of dist. of same name in Chota Nagpur div., Bengal, India, 155 m. s.s.w. of Patna. Pop. of dist. 1,188,562.

Chartres, the site of the battle of Loigny-Poupry, Dec. 2, 1870, when the French were defeated by the Germans under the Grandduke of Mecklenburg. This victory led to the fall of Orleans.

Loire. (1.) The longest river in France, rises in Mt. Gerbier-de-Jonc, Cevennes, in dep. Ardèche, and flows N. and N.W., s.W., and finally W., reaching the Bay of Biscay between St. Nazaire and Paimbeuf, after a course of 620 m. It passes the towns of Roanne, Nevers, Orleans, Blois, Amboise, Tours, Ancenis, and Nantes, and receives on the r. bk. the Arroux and the Maine, on the l. bk. the Allier, Cher, Indre, Vienne, Thouet, and Sèvre Nantaise. It is subject to frequent floods, and dikes have been constructed in



Loharu, cap. of native state, India, in the S.E. of the Punjab, 85 m. w.s.w. of Delhi. Area, 226 sq. m. Pop. 15,233.

Lohengrin, son of Parzifal, and one of the knights of the Holy Grail, whose adventures form the subject of a 13th-century poetical romance. The legend runs that he was conveyed in a car drawn by a swan to Mainz to rescue Elsa, daughter of the Duke of Brabant. After fighting her enemy, Telramund, he married Elsa. His wife, in spite of his dissuasion, endeavoured to ascertain his previous history. He gave the information, and at once the swan and car appeared, and he returned to the Grail. On this story Wagner founded his opera Lohengrin (1848).

Loigny, vil. in dep. Eure-et-Loir, France, 25 m. s.s.r. of

some parts to prevent destructive inundations. The Maritime Canal of the Loire was opened in 1892, between Paimbouf and Martinière, to enable vessels to reach Nantes (31 m.) without navigating the shallow estuary. The Canal Latéral à la Loire accompanies the river all the way from Roanne to Briare, from which it proceeds to the Seine. The Loire is also connected by canal with the Saône. (2.) Department of central France, formed from parts of the ancient Lyonnais and Forez, is bounded on the N.W. and N. by Allier and Saôneet-Loire, and on the s. by Haute-Loire and Ardèche. It is 1,838 sq. m. in area, and is largely mountainous. The department is drained centrally and towards the N. by the Loire and its tributaries, and in the s.E. by the tributaries of the Rhone. The coal field is one of the richest in France, and iron and lead are mined in large quantities. Hardware, cutlery, machinery, ribbons, and muslins are manufactured, and the silk industry is important. The mineral springs of St. Alban, St. Galmier, and Sailsous-Couzan attract many visitors. There are three arrondissements—St. Etienne (cap. since 1855); Montbrison, in the W.; and Roanne, in the N. Pop. 647,633.

Loire, Haute-. See Haute-

Loire - Inférieure, maritime dep. of W. France, formed from part of ancient Brittany, and lying between the Bay of Biscay in the w. and the dep. of Maine-et-Loire in the E. The depart-ment is 2,693 sq. m. in area, and is drained from E. to W. by the Loire and its tributaries, the Sevre-Nantaise and the Erdre; the N. portion drains to the Vilaine. The surface is generally flat. Salt is largely manufactured from the coastal marshes. South of the Loire, in the Pays du Retz, lies the Lake of Grand Lieu. Cereals, vines, flax, and fruit are cultivated. The chief industries are the manufacture of hemp and linen, and of machinery, especially at Nantes and St. Nazaire. In the latter there is also shipbuilding. There are five arrondissements-Nantes (cap.), Ancenis, Château-briant, Paimbœuf, and St. Na-zaire. Pop. (1901) 664,971.

Loiret, dep. of central France, formed from ancient Orléanais and Berry, and lying N.E. of Loir-et-Cher and W. of Yonne. Area, 2,614 sq. m. The s. portion is drained by the Loire and its tributaries, the N. by the Loing and Essonne, towards the Seine. The plateau of Orleans, occupying the W. and N.W. part of the department, comprises a large tract of land of great fertility. Wheat, sugar beet, and the vine are cultivated. Distilling and sugar-refining are carried on, and hosiery and porcelain are manufactured. There are four arrondissements - Orleans (cap.), Gien, Montargis, and Pithiviers. Pop.

(1901) 366,660.

Loir-et-Cher, dep. of central France, formerly part of Orléanais and Touraine, lying between Eure-et-Loir on the N. and Indre on the s. Area, 2,478 sq. m., consisting mostly of plain. The N. is drained by the Loir, the centre by the Loire, and the s. by the Cher. Forests cover one-sixth of the surface. Cereals and fruit are cultivated; other industries are sheep and poultry rearing, bee-keeping; woollens, cottons, leather and glass manufactures. There are three arrondissements—Blois (cap.), Romorantin, and Vendôme. Pop. (1901) 275,538.

Lois, ALFRED (1857), French Roman Catholic theologian, was born at Ambrières (dep. Marne); was professor at the Catholic Institute (1881-93) in Paris and lecturer at the Sorbonne in the same city (1900-4). He has written Histoire du Canon de l'Ancien Testament (1891); Histoire Critique du Texte de l'Ancien Testament (1892-3); Etudes Bibliques (ed. 1903); La Religion d'Israel (1901); L'Evangile et l'Eglise (ed. 1904). In 1903-4 several of his works were condemned by the papal see.

Loja. (1.) City, prov. Granada, Spain, 30 m. w. of Granada, romantically situated in a valley on the river Genil. The town contains the ruins of a Moorish castle, several notable churches, and a modern palace of the Duke of Valencia. There is some trade in grain and cattle. Pop. (1900) 19,143. (2.) Loja, or Loxa, cap. of prov. of same name, Ecuador, S. America, beautifully situated, at an altitude of 6,900 ft. near the S. frontier. It has a cathedral, founded in 1546. The province is famous for its cinchona bark. Pop. 10,000.

Lokeren, tn., prov. E. Flanders, Belgium, 11 m. N.E. of Ghent; manufactures cottons, lace, and tobacco. Pop. 21,000.
Loki, one of the principal beings in Scandinavian mythology, possessing great physical beauty, combined with exceptional ability and cunning, which frequently perplexed the other deities. He may be regarded as the Scandinavian 'spirit of evil,' or Norse

Mephistopheles. See BALDER.

Lokman, the name of two persons in Arabic tradition. The first was said to have made the Ma'rib dike, and in reward for his virtues to have been dowered with the lives of seven vultures, these birds being said each to live eighty years. The other is variously described as an Abyssinian slave of David's time, or a relative of Job, or is identified with Balaam, the names possessing the same root meaning, 'swallower' or 'devourer.' To him were ascribed fables, proverbs, and poems. See Derenbourg's Fables de Logman le Sage (1850), and The Thousand Nights and a Night, edited by Lady Burton.

Lollum, a genus of grasses, tribo Hordeæ, of which, perhaps, the most valuable member is the Italian rye grass (L. italicum), a variety of our native L. perenne. The darnel (L. temulentum) is said to be the 'tares' referred to in the gospels.

Lollards, The, a religious body which, in the 13th or 14th century, opposed the doctrinos and customs of the Church of Rome. The term Lollard was applied in the

latter half of the 14th century to the followers of Wycliffe. The Lollards soon outdistanced Wycliffe; and John of Gaunt, Wycliffe's most zealous defender, showed no sympathy with their aspirations. When Henry of Lancaster deposed Richard (1399), he ascended the throne with the full concurrence of the church. Henceforth the Lancastrians assisted the church to suppress Lollardism. Henry IV. passed the statute De Heretico Comburendo, and William Sawtró was one of the first Lollard victims (1401). But Henry was unable to suppress the Lollard movement. One of

Lolos, or NESUS, an aboriginal tribe in China, inhabiting the mountainous country Ta-liangshan, lying between the Yangstse-kiang and the Chien-chang valley. They are now nearly all subject to Chinese rule. In features, dress, and language they are quite distinct from the Chinese. See Hosie's Three Years in W. China (2nd ed. 1897) and Garnier's Voyage en Indo-Chine (1873).

Lomaria, a genus of ferns (order Polypodiaceæ), with dimorphous fronds, and linear sori occupying the space between the midrib and the edge of the frond.



Lombardy.

the most distinguished leaders of the movement in the later years of Henry IV.'s reign, and in the early years of Henry V., was Sir John Oldeastle, who became Lord Cobham. In spite of the orthodox policy of Henry VI., Lollardism smouldered on, representing the general dissatisfaction with the papacy. In Tudor times Lollard opinions gradually triumphed, and in 1547, the first year of Edward VI.'s reign, all statutes against Lollardism were repealed. See Apology for the Lollards (1842); Brown's The Leader of the Lollards (1848); Trevelyan's England in the Age of Wycliffe (new ed. 1904), Powell and Trevelyan's The Peasants' Rising and the Lollards (1899); and Poole's Wycliffe and Movement for Reform (1889).

L. spicant is a British species (also known as Blechnum boreale, or 'hard fern'), of which there are numerous varieties, many worth cultivating. Among other species are the half-hardy L. pumila, from New Zealand; and the greenhouse L. nigra (New Zealand), L. procera (W. Indies), and L. qibba (New California).

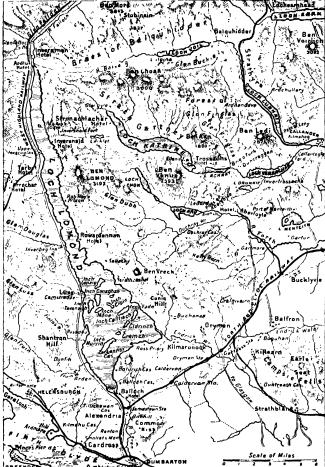
Lomatia, a genus of sub-tropical shrubs and trees, order Proteaceæ, chiefly grown for the beauty of their leaves. L. sitatfolia has leaves which are green above and glaucous below, and bears long racemes of white flowers; L. tinctoria has beautiful pinnate leaves; and L. ferruginea has leaves which are dark green above and downy below. A soil of peat and light loam is suitable.

Lomatophyllum, a genus of succulent plants, order Liliaceæ. They bear fleshy leaves in a cluster at the summits of the stems. L. aloiflorum, the Bourbon aloe, with broad leaves and yellow and brown flowers, is sometimes cultivated in greenhouses. Lombard, Peter (c. 1100-60), theologian, bishop of Paris, was

born at Novara, Lombardy. Edu-

Lombards, or Longobardi, a German people who, at the beginning of the Christian era, settled on the Lower Elbe, and in the 5th century seem to have migrated to the regions of the Danube, where they became converts to Arianism. Throwing off the

yoke of the Herulæ (490), under whose domination they had fallen, they destroyed the Gepidæ (566), Edchearphead



Loch Lomond, the 'Queen of Scottish Lakes.'

cated at Bologna, he went to France, where, through the influence of Bernard of Clairvaux, he obtained a professorship of theology at Paris, and was appointed to the bishopric in 1159. became famous through his Sen-tentiarum Libri Quatuor, a collec-tion of extracts from the fathers. His Works, edited by Aleaume, were published (1546).

took possession of Pannonia, and under Alboin invaded Italy (568). There they easily established themselves in the northern half, with Pavia as their capital. They were induced by the support of Gregory the Great and by their remarkable queen Theodelinda to accept the Roman Catholic form of the Christian faith. Charlemagne reduced the Lombard kingdom to a province of his own empire (774), the Lombards thereafter becoming merged in the general Italian population. Se Lombardes en France (1892). See Les

LOMBARDS is also the name of those merchants from the com-mercial cities of N. Italy who acted as bankers, or rather money-lenders, to the kings of England from the time of Henry III. (1216-72) to the time of Edward III. (1327-77). They came first to England as the financial agents of the popes, who had many dues to collect; and probably began the business of money-lending with those from whom they were demanding payment of the pope's tenths. After the expulsion of the Jews from England (1290) the Edwards borrowed largely from the Lombards. Edward 11. paid off his father's debts (£56,500) to the Frescobaldi, (£56,500) to the Frescobaldi, £1,800 to the Bellardi, and £4,600 to the Bardi. Edward III. borrowed so freely that these Lombard bankers began to look to their securities; but in spite of their caution, the chief firms, the Bardi and the Peruzzi, became bankrupt-Edward III. owing the former 900,000 and the latter 600,000 crowns. During the following centuries we find English merchants taking their place alike as traders and as money-lenders. The Lombards money-lenders. The Lombards had offices in the street which still bears their name. Their usurious transactions caused their expulsion from the kingdom by Queen Elizabeth. See Cunningham's Growth of English Industry

and Commerce (1896).

Lombardy, div. of N. Italy, being the central part of the long depression between the Alps and the Apennines, drained by the Po and its tributaries, and having Piedmont on the w. and Venetia on the E. It comprises the provinces of Bergamo, Brescia, Como, Cremona, Mantua, Milan, Pavia, and Sondrio, and covers an area of 9,297 sq. m. Much of it is very fertile and extensively irrigated, yielding maize, wheat, rice, flax, and grapes. The division is noted for its silk industry. Iron and zinc ores are mined. The chief city is Milan. Pop. (1901) 4,282,728.

Lombok, one of the Lesser Sunda Is., forming with Bali on the W. a residency of the Dutch E. Indies. Area, about 2,000 sq. m. It is volcanic in origin and mountainous in character, the highest peak being Sangkarejan (12,460 ft.). The valleys are fertile, and yield rice, maize, tobacco, coffee, indigo, and sugar-cane; cattle and horses are bred. Mataram is the capital; Ampa-nan on the W. coast is the sea-port. Pop. estimated at over 600,000, chiefly Sassaks and Balinese,

Lombroso, CESARE (1836), Italian criminologist, was born at Verona. He was appointed (1862) professor of mental diseases at Pavia University, where he instituted an asylum for the insane, a psychiatric museum, and a series of researches in the application of exact scientific methods to the study of insanity. He sub-sequently became director of a lunatic asylum at Pesaro, and finally received his present appointment as professor of forensic medicine and psychiatry at Turin. His writings on insanity and criminology form a long list; but the two works which have done more, perhaps, than any other to bring him fame are L'Uomo delinquente (1876-89), and L'Uomo di genio (1889; Eng. trans. 1891). The views and investigations of Lombroso, and his doctrine of a criminal type,' have given him a world-wide reputation, have profoundly influenced the study of the whole subject of insanity and criminology, and considerably affected the administration of continental prisons and lunatic asylums.

Lomond, Locu, between Dumbartonshire and Stirlingshire, Scotland, which from its size and picturesqueness is justly entitled the 'queen of Scottish lakes.' It covers an area of over 27 sq. m., is 21 m. long, and in breadth varies from 5 m. to 1 m., the southern portion being wide and islandstudded. Ben Lomond overlooks it from the E., and the double-peaked Ben Voirlich rises from its N.W. shore. It drains to the Clyde by the Leven at the southern end. Of the thirty wooded islets, the best known are Inchmurrin, Inchmoan, Incheailliach, and Inchlonaig, the first containing the ruins of Lennox Castle. On the eastern shores are Bal-maha, Rowardennan (for Ben Lomond), and Inversnaid (the centre of the Rob Roy country, famous for its falls, and the reputed scene of Wordsworth's vision of A Highland Girl); on the w. are Luss, Tarbet, and in the N.W. Ardlui.

Lom-Palanka, tn., capital of Lom-Palanka, Bulgaria, at the junction of the Lom and Danube. It is a steamship station, and the chief mercantile emporium for N.W. Bulgaria. Pop. over 8,000.

Lomza (Russian Lomja). (1.) Province of Russian Poland, W. Russia, bounded on the N. by Prussia and Suwalki government, on the E. by Grodno, on the S. by Siedlee and Warsaw, and on the w. by Plock. Area, 4,667 sq. m.; pop. 585,781 (mostly Roman Catholies). (2.) Town, cap. of above prov., 75 m. N.E. of Warsaw, on l. bk. of Narev. Pop. (1897) 26,075.

5' 48" w.), the largest city in the world, and the capital of England and of the British Empire, stands on both banks of the river Thames, which is both tidal and navigable, and which at London Bridge (where it narrows) measures 325 yds. across. London may be taken as distant 50 m. from the sea, for the Port of London extends from London Bridge to Queen-borough on Sheppey I. (50 m.), though the strict limits are from London Bridge to Blackwall. The Thames Conservancy, however, has jurisdiction from the Nore to Oxford. The Port of London being thus more or less indeterminate, London itself is even more so. It stretches its ever-growing tentacles into the four counties of Essex, Middle-sex, Surrey, and Kent. Within its various boundaries London may be defined in the following ways: (1.) The Metropolitan Police District, or 'GREATER LONDON,' which extends over a radius of 15 m. from Charing Cross, and has an area of upwards of 692 sq. m., a population (1904) of 6,907,756, and a rateable value (1903-4) of £48,570,769.
(2.) Registration, or INNER LON-DON,' coterminous with the administrative County of London. This is bounded roughly by Highgate and Hampstead on the N., by Woolwich on the S.E. and Blackwall on the E., by Sydenham on the s., and on the W. by Hammersmith and Putney. Inner London covers 117 sq. m., and contains a population (1904) of 4,648,950, and a rateable value of £41,078,113. (3.) The CITY OF LONDON within municipal and parliamentary limits: area, 673 ac.; a sleeping population of caretakers (1901) of 26,923 (in 1861, 112,013); the day or working population rises to over 1,000,000. In addition to these three there is the Central Criminal Court district, with an area of 420 sq. m., and a population (1901) of 6,101,664.

The City of London proper

London (lat. 51° 30′ 48" N.; long.

lies on the N. bank of the river. stretching between the Thames and Finsbury, and E. and W. from the Tower to Temple Bar. Both in size and shape it corresponds very nearly to the ancient Roman London, even as its chief thoroughfares, Cannon Street, thoroughfares, Cannon Street, Cheapside, Bishopsgate Street, etc., themselves run over the sites of Roman streets. Four bridges-Blackfriars, Southwark, London, and the Tower (the last built on the bascule principlei.e. a balanced bridge which can move up or down) -connect the City with the Borough or Southwark on the s. side. Along the river front are strung out various steamer-piers, Queenhithe Dock, the steam-packet wharf by London Bridge, Billingsgate Fish Market, the Custom-House, and the Tower.

Within the City precincts stand famous buildings and monuments too numerous to detail. Among them, however, may be mentioned the Guildhall (1411, rebuilt 1789) in King Street, off Cheapside; St. Paul's Cathedral; the Mansion House, the official residence of the Lord Mayor; the Bank of England; the General Post Office at St. Martin's-le-Grand; St. Bartholomew's Church in Smithfield, the finest example of Norman architecture in London, if not in Great Britain; and the Monument (202 ft. high) to commemorate the Great Fire. For the City markets see below—MARKETS.

The topography of the City is very simple. Its main arterial thoroughfares — Upper Thames Street, Cannon Street, Cheapside with the Poultry, and London Wall (which defines part of the course of the old wall round the City)-run in a parallel E. and W. direction, intersected by numerous cross streets forming roughly rectangular blocks. At either end of Cheapside-Poultry there is a nodus whence radiate several streets in many directions. The Poultry end is the most important, for thence branch off (past the Bank, the Royal Exchange, and the Mansion House) Princes Street, Thread-needle Street, Cornhill, Lomstreet, Cornnill, Lombard Street, and King William Street—the focus of London's and the world's financial activity. Cheapside, the Golden Cheapside of Harrish et al. Cheapside' of Horrick, still the main contral artery of the City, no longer enjoys its old pre-eminence as a centre of commerce and finance. That has shifted eastwards, just as the shipping interest has settled itself chiefly in Leadonhall Street and Fonchurch Street. But, as of old, Lombard Street is still one of the main seats of the banking industry; large mercers still have their shops in St. Paul's Churchyard; Paternoster Row continues to be the quarter of book publishers; and Fleet Street (the home of journalism) maintains its reputation for taverns, which have been its special feature for centuries. One of the most noted of the Fleet Street taverns is the Cheshire Cheese, onco a favourite resort of Dr. Johnson, whose accustomed seat is still pointed out.

Though the City of London was the nucleus of the metropolis, and is still the chief centre of commercial and financial activity, the kornel, both in point of extent and complexity of interests, is now overwhelmingly surpassed by the shell—that is, by the County of London.

The County of London was established by the Local Government Act of 1888, and covers an area of 117 sq. m., with boundaries coterminous with the area over which, prior to 1889, the Metropolitan Board of Works exercised jurisdiction. It should, however, be noted that the London Government Act of 1899 made some slight re-arrangements of the county boundaries, the principal being that Penge in the 8. was taken out of, and South Hornsey in the N. was added to, London. The boundaries have already been indicated. The following is a list, with statistics, of the twenty-eight boroughs of which the County of London consists:

with its engineering shops, telegraph works, and chemical works, contains Greenwich Hospital for sailors, naval schools in connection with it, and the Royal Observatory. At Greenwich, too, is a huge power station to supply electricity to all the S. London tramways operated by the County Council. Deptford is no longer the site of the royal dockyard (closed in 1869), where Drake received his knighthood, but possesses the Royal Victoria Naval Victualling Yard, and also the London Corporation's foreign cattle-market. Deptford devotes itself to marine engineering. Bermondsey, with its extensive tanvards and wharves, is one of the lowest-lying districts of S. London.

Lambeth, too, stand Bedlam, or Bethlem Royal Hospital for the Insane (originally founded 1247 as a priory at Bishopsgate), and one of London's two great cricket grounds, Kennington Oval. The people of Battersea are fortunate in the possession of Battersea Park (185 acres), and in their easy access to Clapham Common on the south. (See BATTERSEA.) Last of all the South London horoughs is Wandsworth, the largest of the twenty-eight, which ands in the parish of Putney

ends in the parish of Putney.

The principal bridges and tunnels connecting London s. of the river with that of the N. bank are Blackwall Tunnel, between Greenwich and Blackwall (cost £1,500,000, used by 4,148,590 pas-

	Area in Acres.	Pop. (1901).	Valuation (£).		Areain Acres.	Pop. (1901).	Valuation (£).
Battersea	2,169	168,907	1,031,769	Kensington	2,188	176,628	2,304,595
Bermondsey	1,506	130,760	925,000	Lambeth	4,105	301,895	1,908,740
Bethnal Green	755	129,680	531,942	Lewisham	7,011	127,495	995,785
Camberwell	4,450	259,339	1,297,572	Paddington	1,400	143,976	1,473,043
Chelsea	650	73,842	822,293	Poplar	2,333	168,822	800,675
Deptford	1,574	110,398	602,831	St. Marylebone	1,506	133,301	1,749,870
Finsbury	588	101,463	980,428	St. Pancras	2,672	235,317	1,800,201
Fulham	1,701	137,289	1,000,000	Shoreditch	648	118,637	768,276
Greenwich	3,837	95,770	603,542	Southwark	1,119	206,180	1,269,276
Hackney	3,299	219,272	1,190,930	Stepney	1,765	298,000	1,433,439
Hammersmith	2,286	112,239	750,508	Stoke Newington	868	51,247	346,131
Hampstead	2,248	81,942	1,037,457	Wandsworth	9.106	232,032	1,713,723
Holborn	409	59,405	972,415	Westminster, City of	2,555	183,011	5,516,725
Islington	3,109	334,991	1,911,654	Woolwich	8,296	117,178	732,445

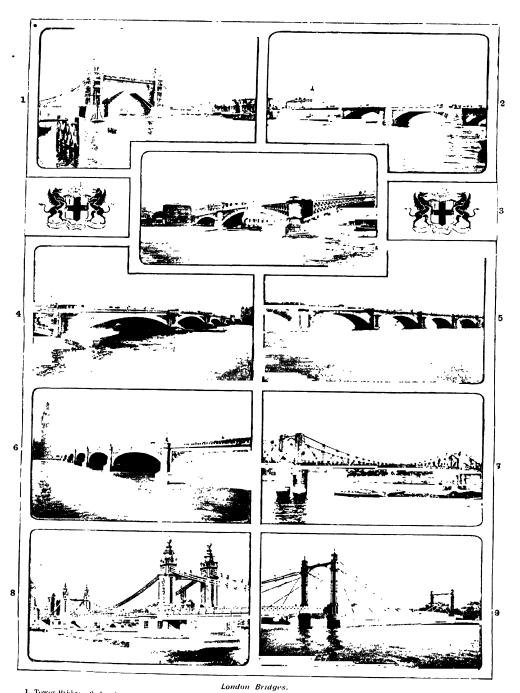
Of these, ten lie to the south of the Thames in the geographical counties of Surrey and Kentviz. (proceeding along the river from W. to E.) Wandsworth, Bat-tersea, Lambeth, Southwark, Bermondsey, Deptford, Greenwich, Woolwich (part - North Woolwich-in Essex), and two inland boroughs, Camberwell and Levisham. The two latter and the inland parts of the riverine boroughs are principally residential, and are inhabited by those who six days a week hurry north-wards over the Thames. Lewisham still contains considerable stretches of open country or fields—in particular the highlying, open, golfing common of Blackheath, near Greenwich Park, where golf was first played in England, probably about the year 1608. Camberwell, densely built over, contains Dulwich College (founded by Edward Alleyn, 1619), and the magnificent but little frequented Dulwich Pic-ture Gallery. See DULWICH.

Coming now to the boroughs bordering on the river, the following is the order from E. to w.:— Woolwich, which includes Eltham and Plumstead, is notable for the possession of the Royal Arsenal and the Royal Military Academy (for the training of R.E. and R.A. officers), the former employing some 12,000 men. Greenwich.

and the cellars of some streets adjoining the river are occasionally flooded by a high tide. Rotherhithe, at the N.E. end of Bermondsey, contains the Surrey and Commercial Docks (350 acres), which import grain and timber, and which keep in touch with the heart of S. London by the Grand Surrey Canal. Southwark, or the Borough, is a borough of dingy, mean streets, with a river-front lined with great warehouses and busy wharves. It is thickly covered with factories. Guy's Hospital stands in the High Street of the Borough. Bankside, Southwark, was, in Shakespeare's day. the home of the amusementmongers of London, for here were the bull-rings, the bear-pits, the notorious 'Holland's Leaguer,' and the Globe, Rose, Hope, and Swan Theatres. The Borough is the seat of the largest hop-mar-ket in the world. Next in order comes the borough of Lambeth, which faces Westminster, and reaches down from the river almost to the farthest southern confines of London County. It contains the district of Brixton. Lambeth Palace, which fronts the river, has been the chief official residence of the archbishops of Canterbury since 1197. To the N., opposite the Houses of Parliament, stands St. Thomas's Hospital (removed to that site in 1870). In sengers and 862,843 vehicles in 1903); a second Thannes tunnel scheme between Rotherhithe and Shadwell has received parliamentary sanction; Deptford Subray, between Deptford and Millwall (used by 3,972,843 passengers in 1903); the Thames Tunnet (finished 1843), between Rotherhithe and Wapping; the Tower Bridge, between Bermondsey and the Tower (opened 1894); the City and Southwark Subway; London Bridge, with a cable subway on either side of it; the Southwark Bridge; Southwark Bridge; Black friars Bridge, with a South-Eastern Ry. bridge on one side, and the tunnel of the City and Waterloo electric tube on the other; Waterloo Bridge; Charing Cross Railway and Foot Bridge, with the Baker Street and Waterloo tube tunnel beside it; Westminster Bridge; Lambeth Bridge; Vauxhall Bridge; Victoria Bridge, south the L.B. & S.C.'s railway bridge beside it; Albert Bridge; Battersea Railway Bridge of the W. London Extension Ry.; Wandsworth Bridge, with a railway and foot bridge beside it; and Hammersmith Bridge.

South London possesses the following parks and commons:

—Plumstead Common, Woolwich



1. Tower Riidge 2. London Bridge, 3. Southwark Bridge, 4. Blacktrar's Bridge 5. Waterloo Bridge, 6. Westminster Bridge, 7. Lambeth Bridge, 8. Victoria Bridge, 9. Albert Bridge,

Common, Greenwich Park, Blackheath, Deptford Park, Southwark Park, Lambeth Paluce Gardens (the private property of the archbishop, but thrown open to the public on certain occasions), Kennington Park, Vauxhall Park, Camberwell New Park, Battersea Park, Brockwell Park, Clapham Common, Wandsworth Common, and a number of other small parks and commons in the southern districts of the boroughs of Wandsworth, Lumbeth, and Camberwell.

The London boroughs on the N. side of the Thames number eighteen. Five lie on the N. -viz. (going from W. to E.) Hampstead, St. Paneras, Islington, Stoke Newington, and Hackney; six abut on the river—Hammersmith, Fulham, Chelsea, Westminster, Stepney, and Poplar; and seven form the central band—Kensington, Paddington, St. Marylebone, Holborn, Finsbury, Shoreditch,

and Bethnal Green.

The northern districts of London lie comparatively high on the w. (highest point 450 ft.), but gradually slope down to the lowlying Hackney marshes around the Lea R. on the E. Celebrated at one time for its medicinal waters, Hampstead continues a favourite residential district and also a resort of holiday makers, who on public holidays throng the famous Heath (240 ac.). Next to Hampstead lies St. Pancras, which stretches from the maze of dingy streets which surrounds the three great railway stations of St. Pancras (M.R.), King's Cross (G.N.R.), and Euston (L. & N.W.R.), through Camden Town and Kentish Town (an old pre-bendal manor, Kentish being a corruption of 'Cantler's,' or 'Cantelupe's') to the breezy slopes of Highgate. Islington, which includes Lower and Upper Holloway and Hornsey, contains a number of religious, philan-thropic, and educational institutions, and also the Agricultural Hall (capable of holding 30,000 people), where cattle and horse shows, military tournaments, etc., are held. On the N.E. of Islington lies the small borough of Stoke Newington, next to which is Hackney, which, though densely covered with working - men's houses between Hackney Downs and Hackney Canal, can yet boast of large stretches of open field and common land towards the river Lea. Immediately s. of Hackney lie two of the seven central boroughs—Bethnal Green and Shoreditch. The former is a wilderness of lower-class houses and factories, but contains the priceless boon of Victoria Park (217 ac.). Shoreditch principally consists of the densely-packed parishes of Haggerston and Hoxton, and reaches down to the

northern borders of the City. Westward lie the parishes of Finsbury—St. Luke's and Clerkenwell. Clerkenwell (once the clerks' or priests' well of pure clear water which formed the chief supply of the district) is the headquarters of the watch and clock making industry, and is also occupied by a number of printing-houses. Here stands the Charterhouse, on the site of an old Carthusian monastery. In 1872 the school was transferred to Godalming in Surrey, but the building is still used as an educational institution by the Merchant Taylors' Co.

Holborn is intersected by the thoroughfare of the same name, across which once ran the little river called the Holbourne in its upper and the Fleet in its lower course. On either side of the thoroughfare lie some of the Inns of Court-Gray's Inn to the N., associated with the name of Francis Bacon, Lincoln's Inn and its Fields on the s.; and in Holborn itself stands the finest example of a 'half-timbered' house in London-Staple Inn. In the district of Bloomsbury, N. of New Oxford Street (which is a continuation of Holborn), lies the British Museum. The street names round the Museum - Chenies Street, Great Russell Street, Bedford Place, Tavistock Square (where Charles Dickens lived)-are reminiscent of the Bedford family, to which a great part of Bloomsbury still belongs.

Sharply divided from Westminster on the s. by Oxford Street (named after Edward Harley, second Earl of Oxford), lies the large parish (anciently known as Tyburn) of St. Marylebone, and the still larger borough of the same name. The brook Tyburn ran through it, and the parish derives its name from the erection of a church dedicated to St. Mary le bourne—i.e. at the side of the brook. At the foot of the great At the foot of the great Roman highway, which now, under the name of Edgware Road, bounds St. Marylebone on the w., stood Tyburn gallows. Marylebone was the residence of many celebrities, including Gibbon, Charles Wesley, Hoyle (an early authority on whist), and Hogarth. Madame Tussaud's great exhibition is in the Marylebone Road. The ancient manor of St. John's Wood in the W. takes its name from its original possessors, the Knights of St. John; in it lies the famous Lord's cricket ground. Marylebone also possesses Regent's Park (472 ac.), the largest of the London parks, containing the Zoological and Royal Botanic Gardens. Just north of the park is Primrose Hill, the only one of the little hills of N. London that is not covered with houses.

Crossing Edgware Road, we

enter the borough of Paddington. which contains the ancient manor of Westbourne, so called after the little stream which once fed the Serpentine River in Hyde Park. South-west of Paddington is Kensington, at its southern end one of the finest and richest residential districts of London. Here are the public pleasure grounds of Kensington Gardens (200 ac.), which contain the old palace of Kensington, purchased by William III. from the Earl of Nottingham in 1600 and Earl of Nottingham in 1689, and given to the nation in 1899. On the s. side of the gardens is the Albert Memorial (1872), and opposite is the Albert Hall (1867-71), an enormous circular building used as a concert hall, and capable of seating some 10,000 persons. In the near vicinity are Olympia (an ex-hibition building), the S. Kensing-ton and Royal Natural History Museums, and the Imperial Insti-tute (opened 1893). To the east of the Imperial Institute is the Brompton district. Earl's Court is a district of West Kensington. Vying in historical importance with Kensington Palace is the quaint Elizabethan building of Holland House (1607), where dwelt at different times Fairfax, the parliamentary general; Addison, who died there; Penn of Pennsylvania; and Charles James Fox, through whose occupancy the house became a great Whig meeting-place up to the beginning of the 19th century.

The boundary borough of Lon-

don county on the w. is that of Hammersmith, which touches the Harrow road on the N., and southward abuts on a bend of the river crossed by a fine suspension bridge. The Uxbridge road runs eastward through Hammorsmith to Acton and Ealing. Next in order along the river-bank is the borough of Fulham. Here, on the river, stands Fulham Palace, the residence of the bishop of London, said to be the oldest inhabited house in England. A little farther down the river is the fashionable Hurlingham Park, the headquarters of pigeon-shooting and polo-playing in England. The next borough is that of Chelsea. Its eastern portion, known as Pimlico, at the beginning of the 19th century was a marshy waste where snipe were shot; while Chelsea parish itself was, in the middle of the 18th century, only an outlying village. Chelsea (Chesil-ey, 'the shingly Chelsea (Chesil-cy, 'the shingly island') has been fenced from the river by an embankment be-tween the Victoria and Battersea Bridges, and on the embankment stands Chelsea Hospital for disabled soldiers. Chelsea is still, as it has long been, a favourite residential quarter. Here, in the 16th century, lived Sir Thomas More, Princess Elizabeth, Anne of Cleves, and Queen Catherine Parr; later, Walpole, Steele, Swift (who lived opposite Deam Atterbury's house, and used to drive into London by 'the sixpenny stage'), and Sir Hans Sloane, whose name is commemorated in Sloane Square and Sloane Street; and, later still, Leigh Hunt, Rossetti, George Eliot, and Carlyle.

The next and greatest of the

London boroughs is the City of Westminster. It is the richest, architecturally the finest, and historically by far the most interesting, of any part of London outside the City. Beginning at Temple Bar (now marked by a griffin on a pedestal) in the Strand, which is the boundary between the two cities of London and Westminster, we plunge at once into the stateliest part of the metropolis. On one side are the Royal Courts of Justice, and, fronting the Strand, the newlyconstructed crescent of Aldwych, whence the thoroughfare of Kingsway furnishes a new route to Holborn; and on the other, farther down the street, are buildings and names — Essex Street, Arundel Street, Somerset House, the Savoy Hotel, Villiers Street, and Northumberland Avenue—that remind us of the great houses of princes and nobles which stretched down towards the river-front, now fenced between Blackfriars and Westminster Bridges by the noble Victoria Embankment. At the west end of the Strand is Trafalgar Square, where the Corinthian column (145 ft.) to the memory of Nelson rears aloft, its pedestal guarded by Landseer's four lions; near it is a statue of General Gordon by Thornycroft. From Trafalgar Square de-

From Trafalgar Square debouch S.W. Pall Mall, the home of many of London's greatest clubs, and (through Spring Gardens) the Mall, which separates Marlborough House (the residence of the Prince of Wales) and the Palace of St. James from the park of the same name. Facing the W. end of the Mall stands Buckingham Palace in its spacious grounds, while across Constitution Hill to the N. spreads the beautiful Green Park (60 ac.). South from Trafalgar Square run Whitehall and Square run Whitehall and Parliament Street, past the Admiralty, the Horse Guards, and other government buildings, to end in the approaches to the Houses of Parliament and Westminster Abbey. North from Trafalgar Square we can pass up the Haymarket to the great nodus of west-end London, Piccadilly Circus. Thence radiate, northeast, the recent thoroughfare of Shaftesbury Avenue, and Long Acre (the home of the carriage

and automobile trade); north, Regent Street, which, with Bond Street, New and Old, boasts London's richest shops; and west, Piccadilly. Narrow at (though a scheme is in hand for widening it eighty feet between the Circus and Sackville Street), Piccadilly speedily becomes perhaps the finest street in London. It contains stately buildings such as Apsley, Devonshire, and Northampton Houses; for half its length it is bordered on the south by the Green Park, and ends at Hyde Park Corner, near a fine triumphal arch which is one of the entrances into Hyde Park (480 ac.), the most fashion-

able park in London.

Northwards and south-west-wards from the w. end of Piccadilly spreads the huge parish of St. George's, Hanover Square, nearly all of which belongs to the Duke of Westminster, whose family name, Grosvenor, is of frequent occurrence in the street names. Passing over the City of London, which has already been dealt with, and continuing along the river, we arrive (in startling contrast) at the grimy region of Stepney, which lies south of Bethnal Green. Eastward of the old ('ity wall lie the Tower of London and the Royal Mint (1817) on Tower Hill. The principal traffic artery of this region is Commercial Road East (s. lies Ratcliffe Highway, now St. George Street, once notorious for robbery and murder); but the main activity of the district centres in the divisions bordering the river, and known as Wapping, Shadwell, and Limehouse. Here begin the docks, the first of the series, close to the Tower, being St. Katherine's Docks (24 ac.); next, the London Docks (120 ac.); and next, Shadwell and Limehouse Basins. (See LONDON PORT.) After Limehouse begins the borough of Poplar, of which the southern portion consists of the low-lying Isle of Dogs, and the northern of Bromley and Bow, which border the river Lea. The name 'Bow' commemorates an arched bridge over the Lea, at or near a point where it was crossed by the 'stratford, ord,' the ford in the Roman street' known as the Vicinal *street' known as the James Way. In the Isle of Dogs are the oldest of London's docks, opened in 1802, the West India Docks (295 ac.); below them is Millwall Dock; and in Black-wall, close to where the Lea joins the Thames, the East India Dock. There the County of London ends. But farther down, on the north bank of the Thames, are the Victoria (90 ac.) and Royal Albert Docks (72 ac.); and farther yet, 26 m. below London Bridge, Tilbury Docks (761 ac.).

To the east of Poplar (outside

Greater London) is the borough of West Ham, and still farther east (71 m. G.E. Ry. from Fenchurch Street) the town of Barking.

The industries and manufactures of London are enormous and most varied. Some of the more special industries may be specified: Brewing, distilling, sugarrefining. These three industries have no particular locality. is manufactured in Spitalfields and Bethnal Green; tanning, soap-boiling, and candle-making are carried on in Bermondsey and Southwark; Lambeth, Millwall, and Deptford have engineering works; potteries are established at Lambeth; and Clerkenwell has an industry of watch-making and

clock-making.

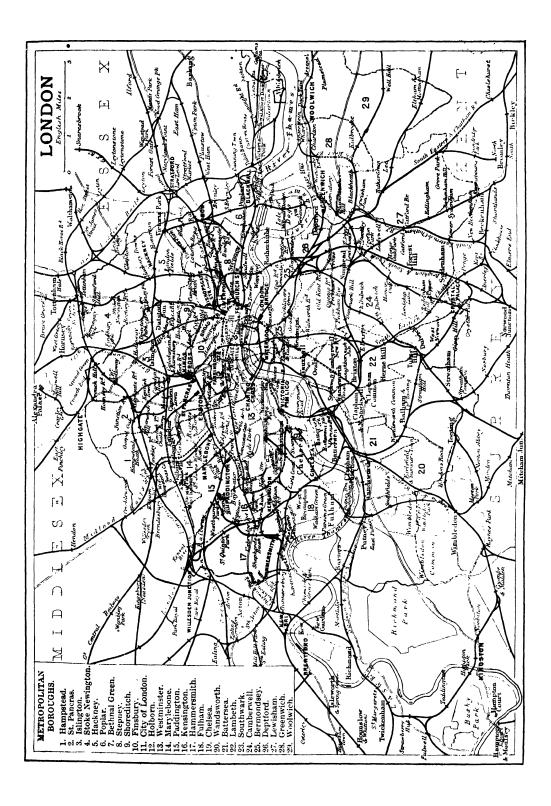
There are close on three hundred different authorities which control the various interests of London, and which spend on the work about £15,000,000 annually. But the supreme municipal authority is the London County Council. (See LONDON - Govern-Council. (See LONDON—Government.) The council's accounts for 1904-5 amounted to £9,048,414, the total county rate being 2s. 91d. Up to the year 1904 the council has provided rehousing for 24,465 persons, and in addition to providing gymnasiums, bands, games, cheap steamboats on the Thames, etc., has since 1901 secured the following parks and open spaces for the people: Marble H.ll, Twickenham (66 ac.); Eltham Park (411 ac.); Avery Hill, Eltham (84 ac.); Hainault Forest (803 ac.); and Springfield, Clapton (821 ac). Thanks to these measures, and and to a careful supervision of drainage and street nuisances, it has brought down the death-rate of London to 15'2 per 1,000.

The Education Committee of the County Council administers both elementary and secondary education within its area. 1905 there were 554,646 (average attendance, 493,975) scholars on the rolls of the council schools, and 205,323 (average attendance, 175,149) on the rolls of the nonprovided schools, or an elementary school population of 759,969. The expenditure on the maintenance of elementary schools for the financial year ending March 31, 1905, was £3,750,422.

HISTORY (by the late Sir Walter Besant).—The origin and foun-dation of London are, and will always continue to be, matters of dispute and controversy. My own theory entirely satisfies, in my judgment, all the difficulties of the case. It may be briefly presented as follows.

We must first consider the site of the city with respect to its local conditions, and next the site with reference to the country generally.

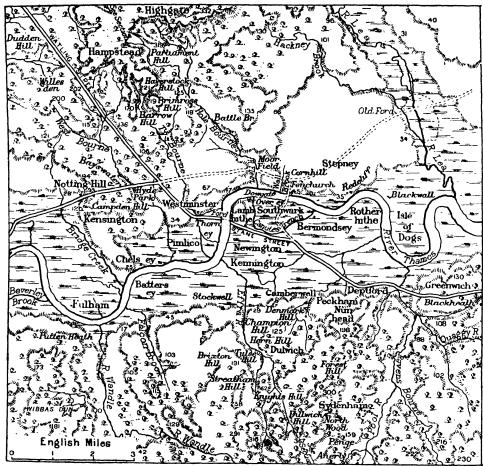
First, as to the local conditions.



The river on which the city stands winds in a serpentine course from Hampton to its mouth through a vast swamp, bordered on the N. and on the S. by a low cliff, the course of which may still be traced by the rising ground which has taken the place of the cliff. Thus, Battersea Rise, Clapham Rise, Brixton Rise indicate the position of the cliff on the S. side;

walls in the Isle of Dogs, a peninsula, and then continues its course eastward to the mouth. The city proper lies between the Fleet R. on the w. and the Tower of London on the E. On the s. side of the Thames stretched the marsh, four miles long from w. to E., and one mile or a mile and a half broad from N. to S. On the E. side of the city the marsh

great western swamp. On the N. of the river, beyond the cliff stretched a vast moor, intersected with small streams and dotted with ponds. The moor was quite useless for purposes of cultivation. Beyond the clearing afterwards called Iseldon or Islington began the immense forest of Middlesex and Essex, covering the whole ground between Har-



London before the Houses.

From Stanford's Geog. Estab., London.

The figures on this map represent the height in feet above Ordnance datum which is 121 feet below Trinity High Water Mark.

while the slopes in Thames Street, the Haymarket, and St. James's Street, for example, show where it stood on the N. side.

It stood on the N. side.

The swamp is the first point of importance to note on the site of London. Reference to any map will show that at Westminster the river bends round towards the N., again at Charing Cross towards the E.; that it

lay along the riverside for two miles before it was crossed by the river Lea, which flowed through a broad marsh of its own on either bank. On the w. side the Fleet also flowed through its own mud banks into the Thames, while the present Fleet Street and the Strand lay at the foot of the cliff, covered with water at high tide, and forming part of the

row and the site of Hainault Forest, and stretching into Hertfordshire and the heights beyond.

The only farm-land available for the city was thus a breadth of pasture-land between Oxford Street and the Strand, the rest of the environment being forest or marsh. This is the second important point to remember. Whatever might be in store for

the future of London, one thing is quite certain—the city, even in its infancy, could never be maintained by any lands outside the walls, or by any adjoining land kept open for the purpose of cultivation. From the outset, when it was little more than a village, London was dependent for its supplies on the settlements and cultivated lands beyond what we now call the suburbs.

Three streams, not to speak of many small brooks, flowed into the Thames on the N. The first, starting from the w., was called the Fleet or the Holbourne. It rose in the northern heights, received the waters of many springs, drained a large expanse of country, and was navigable for a very short distance above its mouth. Through the middle of the site on which afterwards the city was built flowed the smaller stream, called the Walbrook. This rose in the northern moor as a tiny rivulet, was joined by other rivulets, and when it gained the Thames was a stream of some importance running through a valley about 130 feet broad, at the point where is now the Poultry, and becoming broader at the mouth. The Walbrook served for many centuries to divide the city into two-E. and W. London. Outside the walls, nearly three miles to the E., the swift and then important river Lea ran into the Thames, through a succession of marshlands which remain to this day. Although drained, they are below the level of high tide, and serve at least to make us understand the marshes of the Thames. Between the Fleet and the Walbrook, and again on the E. of the Walbrook, the northern cliff advanced to the edge of the river, which it overhung. It was a bank of stiff clay from twenty to thirty feet high, the foot of which, being continually washed by the river at every high tide, was gradually worn away.

The advance of the cliff at these points is the third point of cardinal importance concerned with the site of London. These, then, are the local conditions of the place: a tidal river almost 1.000 feet wide: marshes on either bank: a wild moorland on the N. useless for agriculture; an impenetrable forest on the N., and another on the S.; a comparatively small area in the w. available for pasture; protection against an enemy by river, marsh, and forest; dependence on supplies, save of fish, birds, and game, from the outside. Add to these an excellent natural port for small ships sailing up the river, at Dowgate, at the mouth of the Walbrook.

The next point to consider is

The next point to consider is the site with reference to the country.

When the Romans arrived, they found in the s. part of our island a civilization at least equal to that of Gaul, and, in fact, intro-duced from Gaul. How long the country had been opened up for trade, what was the extent of the trade, and when the immigration from Gaul began, it is impossible to determine. For reasons too long to be considered in this place, I am of opinion that many generations, perhaps many centuries, passed between the arrival of the Gauls and that of the Romans. The foreign trade, such as it was, great or small (I believe it to have been very considerable), was carried on through the southern ports, and especially through Dover and Southampton. The main artery of trade, the chief road - little more than a track even in summer - ran through the middle of the island from N. to S., passing over the Thames at its first ford. This ford crossed a marsh, and an island or eyot in the marsh, before it reached the river. After the river the track crossed the marsh on the s. side by a causeway to the higher ground, and then struck s.E. in order to reach Dover, Richborough, and Sand-wich, or s.w. to reach Southamp-ton. The island was that afterwards called Thorney, a small oblong tract of land rising just above high-water mark, and situated at the mouth of a little stream which brought down in its course branches, trunks, and leaves, which were caught at the outflow, and so formed the island. Long, therefore, before London was founded, the trade of the

country passed over Thorney. The foundation of London has no connection at all with the arrival of the Romans. It is described by Aulus Plautius in the 1st century, and only a few years after the conquest, as a great commercial resort; it took the place of Thorney gradually, but long before the Romans came. The natural advantages of London over Thorney were the ports of the Walbrook and the Fleet, the existence of the high northern cliff running down to the river above the malarious and aguestricken marsh, and the easy defence of the place by reason of its natural position. The site its natural position. The site was also well watered, and capable of being converted, by quays built on piles, into a place of commerce far more extensive and more convenient than the small, low-lying, defenceless islet of Thorney.

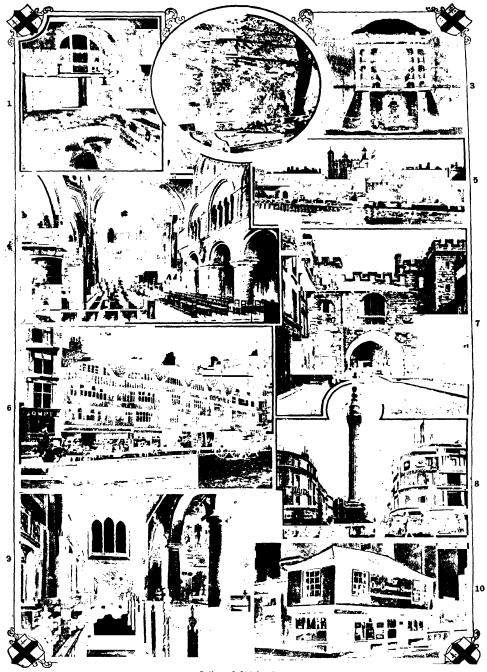
In this way London was founded and gradually grew. Its name signified probably the 'ship-fort,' and is of Celtic, not of Roman or Saxon, origin. The old line of traffic which ran down the

Edgware Road, and so across the Park to the river, was diverted at the spot which is now the Marble Arch, and ran along the present Oxford Street and Holborn, crossing the Fleet R. by a ford and afterwards by a bridge, and so into the city. After the building of the city wall the traffic entered by a gate near but not on the site of Newgate. must remember that at first there was no wall to protect London; there was no need of a wall. The quays and ports built by the early merchants were deserted in the winter; in the summer, and for two or three months only, there was a considerable concourse of those who bought and sold; the trade of London was carried on at an annual fair, so to speak, held every summer; there were no buildings; there was no town, as we understand a town; there was no attempt at walls, fortifications, or defence, because there was nothing to defend except at the time of the annual fair, when the traders themselves were perfectly able, without the help of walls, to defend their own wares against any attack that might be made upon them. No bridge then spanned the river; the only permanent residents were the fisher-folk, those who trapped the wild birds of the marsh and the game of the forest, and the slaves of the port.

That such was the condition of London when the Romans arrived They seems tolerably certain. selected the high spot on the E. side of the Walbrook for the site of a citadel and place of arms, and erected on this spot a fort, solid, strong, and impregnable, with access to the N. and the W. by gates, and to the s. by a bridge over the river. Foundations of the citadel have been discovered at various points. It reached from the Walbrook to Mincing Lane, and from Cornhill to Thames Street. The first bridge, according to my view, was built at the same time as the fortress, for which it afforded communication to the s., and was at the same time a means of offence and defence.

Roman London, then, consisted of the citadel first, with the bridge. There was no wall; and the trade of the place, which seemed to Tacitus so considerable, was in reality very small compared with its subsequent development. There was certainly a port beside the Bridge Gate—an artificial port cut out of the soft mud and shingle of the foreshore, supported and kept open by piles on which quays were constructed communicating with the Bridge Gate. This port was afterwards called Billingsgate or Lundentuneshythe. There was another and an earlier port formed





Relics of Old London.

1. Roman Bath, Strand Lane. 2. Roman Wall, London Wall. 3. London Stone, Cannon Street. 4. St. Bartholomew's Church, Smithfield (Norman). 5. The Tower (Norman, etc.). 6. Old Houses in Holborn. 7. St. John's Gate, Clerkenwell. 8. The Monument. 9. Charterbouse Chapel (associated with Thackeray's Newcomes).

10. Old Curiosity Shop, Portugal Street (said to be the one which gives the title to Dickens's novel).

by the mouth of the Walbrook; there was a third, also artificial, though the date of its construction cannot be ascertained, on the site now called Queenhithe. is also probable that Puddle Dock is a site of a fourth port; while, across the river, St. Saviour's Dock probably dates from Roman times. Here also was an ancient ferry across the river, much more frequented than the bridge, being easier of access and quicker. In these ports, and on quays constructed beside them to right and left, was carried on the export and import trade of the city.

The history of the city during the Roman occupation contains few events. In 61 A.D. the place was taken, and the defenceless people were massacred. Two hundred years later it was held by the usurpers Carausius and Allectus, the latter of whom was defeated and slain by the Roman general Asclepiodotus in a battle fought close to London. When, in the 4th century, Roman roads made it possible for an invading army from the N. to march upon London, the wall was constructed. Its length proves the extent of the population of the city, because it was never the custom of the Romans to build more than they could defend. The area enclosed by the wall was 380 acres; the length of the wall, including the riverside part, was two miles and three-quarters. There is evidence that it was hastily built. There was no time to procure stone enough for the purpose from the quarries of Kent; the remaining portions and foundations have disclosed the fact that wherever stones existed in the city they were seized and built into the wall. Thus altars, millstones, funeral monuments, statues, columns on walls of villas, the walls of the citadel, the walls of every public building, including the forum, the imperial offices, the theatre, and the construction of this huge wall, creeted in the fear of invasion from the north. This was towards the end of the 4th century.

The retirement of the Romans and the coming of the Saxons followed. Nothing is then known of the city until the year 457 A.D., when we hear of the fugitives from the victorious Saxon invaders flying for safety across the bridge of London.

Early in the 7th century we hear of London again; it then belonged to the E. Saxons, and there was founded a Christian church under Mellitus as first bishop. Trade slowly revived, merchants began to return, and London in the 7th and 8th centuries became once more a great commercial centre.

Then the Danish invasions took place, and London, taken by the invaders and apparently pillaged, again lay desolate and deserted until it was recovered by Alfred. He repaired the defences, and made of London the strongest and, before long, the richest city in the island. The condition of the wall is shown by the fact that Alfred did not take the trouble to repair the old gates, but constructed new gates at Aldersgate, Newgate, Bishopsgate, and probably posterns at Ludgate and Cripplegate. So strong did he make London that the power of the Danes and Normans in repeated reigns could not take the city. So great was the trade in consequence of the confidence inspired by this strength that merchants flocked to London from Rouen, Caen, Germany, and the Low Countries.

The history of London itself is difficult to separate from the history of the country. Successive charters secured the liberties of the citizen. The sovereign might and did tax and assess the people heavily; but when from time to time the citizens presented a passive resistance to taxation, no monarch had the power to coerce them. As London grew more powerful, the demands of the sovereign grew greater; and the people of London became more exacting over the extension of their liberties, and more jealous of encroachment. This is the keynote for the historian. There existed among the people of London a traditional resolve – unwritten, but part and parcel of themselves - to maintain and to

defend their liberties.

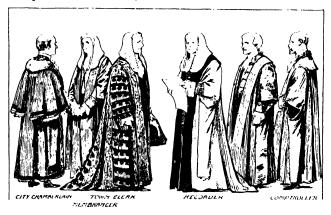
This side of the city history is best illustrated by a few notes on the growth of the municipality. On the resettlement of the city by Alfred, the whole of the area included within the wall was parcelled out into manors. Every manor was called after the name of its owner, who was its alderman, and exercised authority, holding courts, and being responsible for order on his own land, It is not certain how many wards or manors there were. There was no corporate government of the city. The king's officer was the port-reeve, whose functions were those of treasurer, guardian of customs and dues, and assessor of the same; he corresponded to the sheriff or shire-reeve of a county. The bishop exercised ecclesiastical jurisdiction, which then included a good deal of the temporal government. There was a folk-mote, or parliament of the people, called together on important occasions at Paul's Cross; and there was the ward-mote, whose powers and tenure of meeting seem to have depended at first mainly on the aldermen of the wards. The export and import trade of the port was regulated by the merchants, subject to the king's dues; the retail trade was subject to the rules of the market, and the ordinances of the guilds, which existed from a very early period. The merchant guild, found in all mediaval cities, was probably regulated, perhaps in a nameless and informal manner,

at the port itself.
The defence of the city was entrusted to a military organization called the knighten guild, whose duty it was to see that the citizens were duly armed for purposes of defence. This guild administered a tract of land outside Aldgate, called the Portsoken, and the Tower lands, whose revenues were devoted to the protection of the city. The guild consisted of the aldermen, notables, and some of the chief citizens. The time came when the defence of the city was practically taken over by the Normans, who had their fortresses in the east and the west; then, by permission of the king, the guild dissolved itself, surrendered its property, and gave it to the priory of the Holy Trinity at Aldgate, receiving in return for themselves, their ancestors, and their own kin, the 'fraternity' of the monastery.

As the guilds arrived at the possession of great power, they were regarded with jealousy by the Norman kings, especially by Honry II., who suppressed twenty of them as 'adulterine' - i.e. erected without royal licence. The chief cause of this jealousy was the establishment of the commune' in many of the continental cities, including Rouen, between which place and London there was an intimate connection. Never,' says the chronicler, would the king grant a commune to London. Yet London, when the advantages of such a corporate body were understood, never ceased to plan the concession. This opportunity arose when Richard I, was in the Holy Land, when the government under Longchamp had become intolerable, and when the barons, headed by John, desired to enter and to take possession of the city, in order to depose Longchamp, which they could only effect by the permission of the citizens. They were admitted; on the same day John gave them the commune, and Longchamp was de-posed. The first mayor was Henry Fitz Aylwyn, or Henry of London Stone, who was elected for life, and held the office for twenty-five years.

Within these limits it is not possible to trace the gradual growth of the municipality. The immediate effects of the first concessions were of the most revolutionary kind. A city council was formed, at which the whole city was represented by the mayor, while the aldermen in their wards lost a great deal of their authority. The merchant guild, under whichever form or name it had existed, ceased to exercise authority in matters of trade; the by side, became one incorporation under one government. Fortunately for the country—paradoxical as it sounds—it was never free from factions, which, while they weakened the city for a time, prevented its separation from the country or its domination over the country.

The mediaval population of





3 Santa fund Robe ordinarily wer

City of London Corporation Liveries.

ordinances of the trade guilds were referred to the mayor; the port-reeve disappeared, and the power of the sheriffs, his successors, was greatly curtailed; the folk-mote, preserved in form, no longer had any power except for purposes of popular demonstration. The city, instead of a collection of manors lying side

London was as mixed as it is at present. The trade with the Baltic and with N. Europe was chiefly in the hands of the Hanse-atic League, which enjoyed great and most valuable privileges. There was a large trade with Bruges, Ypres, and Ghent; many Flemings were settled in the country, and there were English

houses of business in Bruges corresponding to the firms of the Hansa merchants in London. The 'Mon of the Empire' were represented by a colony from Cologne; there was a constant intercommunication between London and Normandy, especially Rouen; Bordeaux sent merchants to conduct the wine trade; the great galleys of Venice and of Genea arrived every year in the port of London, and were received by Italian merchants; there was an extensive trade in English ships with the Levant; the Jewish money-londers, after their exbulsion, were succeeded by Lombards and 'Coursines,' licensed by the Pope to receive his taxes and to lond money under the form of gifts for which 'expenses' were charged instead of interest. The immigration of foreigners to London never ceased, and the early chronicles are full of names which denote their origin.

The influence of the church was also a very powerful factor in the government of the city. The bishop of London, even when he

was personally unpopular, continued to stand for the city in ecclesiastical matters, and was regarded by the people as part of their own grandeur, and an illustration of their own wealth and strength. The dean and canons of St. Paul's owned a conside able portion of the city, and were patrons of many city churches. The monastic houses occupied large premises, and owned, in addition, whole streets; while there were now a hundred parish churches, each with its rector or vicar, its chantry priests, and its endowments of masses and various charities. The people employed in the service of the church—the architects, lawyers, notaries, scriveners, illuminators, bailiffs, gardeners, butlers, brewers, bakers, carpenters; makers of vestments, paternosters, crucifixes, candlesticks, altar-cloths, painted windows, and the like --numbered many thousands, per-haps a fifth part of the whole

population.

The monastic houses formed a chain within and without the city wall. Thus, without the wall, beginning at the E, were St. Katherine's by the Tower, St. Mary of Graces, the Sisters of St. Clare, Bethlehem, St. Mary Spital, Holywell, Charter House, St. Francis' Nunnery, the House of the Knights Hospitallers, St. Bartholomew's Priory and Hospital, White Friars, St. Mary of Roncesvalles, Westminster Abbey, and the Temple. Within the walls, following the same direction, were the Crutched Friars, the Holy Trinity, St Augustine's, St. Helen's, Elsyng Spital, St. Francis' Hermitage,

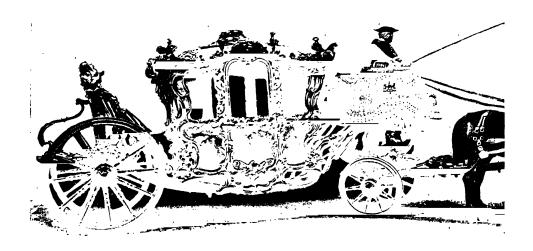
Gray Friars, Black Friars, and St. Martin's-le-Grand. On the s. side of the river were the foundations of St. Mary Overies and St. Thomas, and Bermondsey. The ecclesiastical foundations hindered the growth of London in most directions. The vast manor of Stepney, which belonged to the bishop of London, and extended N. so as to include Hoxton and Houndsditch, was kept free from any but farm-buildings. The moor was only built upon without Bishopsgate and Aldersgate. The lands of Westminster extended eastward as far as the Fleet R. The manors of Gray's Inn, St. Pancras, St. Giles, Bloomsbury, Islington, and St. Luke, as well as Old Street, belonged to the canons of St.

Then the great retail markets of West and East Chepe, with the Poultry, Newgate Street, Cornhill, Leadenhall Street, and Grace-church S.reet. Lastly, occupying the N. part of the city, was the industrial quarter, in which everything was made. It is a rough division, not to be taken literally, but it will serve. The last part consisted of hamlets separated from one another by orchards and gardens, with narrow lanes leading to the markets, and one church to several hamlets.

The successive kings either tried to oppress or to conciliate the city. Its greatest enemy was Henry III. During his long reign trade decayed, and the city fell into a kind of anarchy, in which lawlessness and violence seemed

Towkesbury; welcomed Henry VII.; stood by Queen Mary; joined the parliamentary cause against Charles I.; restored Charles II.; sent James II. on his travels. This is a most remarkable record of king-making and king-breaking, unequalled in the history of any other city.

We must not forget the trade of London. For many generations the chief export was wool. There was no export and import of food-stuffs, save on rare occasions; each village was sufficient to itself, or contributed to the wants of the neighbouring towns. The imports of the country consisted principally of luxuries, such as fine stuffs, silks, velvets, weapons, spices, wine, oil, and so forth; while the exports con-



The Lord Mayor's State Carriage.
(Photo by the London Stereoscopic Co., Ed.)

Paul's. Most of Clerkenwell and Highbury belonged to the Knights Hospitallers; Canonbury to the canons of St. Bartholomew; Paddington, Westhourne, Kilburn, and Hampstead to Westminstor Abbey; part of St. Marylebone to Hackney Abb.y, with other manors and country places.

The belt of ecclesiastical manors was largely the cause of the crowded condition of the city. We find, for instance, that there were in the 12th or 13th century four belts of population. First the service, including the people who lived by the riverside, in streets reclaimed as space was wanted from the foreshore on either side of the artificial ports. Then came the merchants and the nobles' houses, lying between W. and E. Chepe and Thames Street.

to defy the authorities. Edward I. took the reins into his strong hands, and restored order after a ten years' suspension of the mayoralty; under the miserable rule of Edward II. lawlessness again broke out, to be repressed under his successor; and so on. It is noteworthy that in the history of the country London has been the chief instrument in the election and deposition of the king. The city upheld Edmund Ironside against Canute; accepted William I.; elected Henry I. in place of his elder brother; elected Stephen; joined the queen in the deposition of Edward II.; sent out its army for the arrest of Richard II.; elected Henry IV.; stood by his son, and supported his unfortunate grandson until the death of the Prince of Wales after tinued to be wool, skins, iron and tin, and in the earliest times slaves. The great outburst of discovery and travel which characterized the 16th century laid the foundation for the expansion of trade, and therefore of empire, in the 17th and 18th centuries. This outburst is marked in the history of the city not only by the increased wealth of the merchants, but also by the creation of the trading companies, of which so many were founded by Elizabeth and her immediate successors.

Fire, plague, and famine from time to time attacked the city. It was in 1666 that the Great Fire occurred which destroyed fifteencity wards, with 13,000 houses. The fire, it is commonly stated and believed, cleared away a great number of narrow courts and lanes. But their successors were nearly as narrow. Pestilence in some form or other was always present in the city. We hear of terrible visitations, such as that of the Black Death in the 14th contury; but we forget that during the whole of the 16th and 17th centuries, down to the last visitation of 1665, the streets of London were never wholly free from plague. Perhaps the boon of a plentiful supply of water, conferred for the first time by the New River Company in 1620, may have done much towards averting more attacks of the discrete.

Other events of importance their importance must not be measured by the brief mention here allotted to them-were the reformation, on the whole welcomed by the people; the dissolution of the religious houses; the Marian persecutions, which consolidated the reformation; the rebuilding of the city after the fire; the foundation of the Royal Exchange, and its subsequent rebuilding after the fire of 1666 and of 1841; the closing of the Exchequer by Charles II., which effectually alienated the merchant class from the Stuarts; the establishment of the Bank of England in 1694; the removal of the city gates in 1760; the piecemeal destruction of the city wall; the filling up of the town ditch; the rebuilding of London Bridge; the building of the many bridges which now span the river; the abolition of imprisonment for debt—an event of the highest importance in a trading city; the decrease of the population of the city proper until it now numbers only a few thousands; the occupation of the suburbs, which are now covered with houses; the enormous increase of the population reckoned over this newlybuilt area; the creating of the London County Council and the metropolitan boroughs.

GOVERNMENT. — For the purposes of the imperial and judicial side of local government the County of London and the City of London are almost entirely distinct, while for the purposes of the administrative side of local government they are to a considerable extent united, forming together the Administrative County of London. The purposes for which local government exists on its imperial and judicial side are: (1) the preservation of the King's peace; (2) the administration of justice in local courts, both civil and criminal; (3) the enforcement of civil process; (4) the militia; (5) the representation of the people in Parliament; and (6) the police. The organization for these purposes in counties

generally consists of the sheriff, the lord-lieutenant, the magistrates, the clerk of the peace, the corroners, the county courts, and the standing joint committee of the County Council and the justices. All these authorities exist in London, but in some cases their jurisdiction is superseded by that of other authorities peculiar to London.

thorities peculiar to London.

The Sheriff.—There are two
sheriffs of the City of London,
elected annually on Midsummer Day in the Court of Common Hall by those freemen of the city who are liverymen of tho city companies. The sheriff of city companies. The sheriff of the County of London is ap-pointed in the same way as in other counties. (See Sheriff.) The sheriffs of the city attend the sittings of the Central Criminal Court, attend the Lord Mayor on official occasions, and share the expense of his entertainments, present the city's petitions to Parliament and addresses to the King. The sherift of the County of London has scarcely The sheriff of the any duties. There are no judges on circuit to be attended, as the county is within the Central Criminal Court District; and there are no county elections, at which the sheriff is the returning officer, because the whole county is within the metropolitan parliamentary boroughs. The other duties of the sheriff are all performed by the under-sheriff or

the deputy-sheriff.

The Lord-Lieutenant.—The lord-lieutenant of the County of London has the same duties as in other counties. (See LORD-LIEUTENANTS.) In the City of London the lieutenancy is in commission—i.e. there is no lord-lieutenant, but a large number of commissioners who together exercise the office.

The Magistrates. -(1.) In the County of London the magistrates are the justices named in the Commission of the Peace for the county. They have all the civil jurisdiction of justices in other counties, both at special and quarter sessions; but their criminal jurisdiction is exercised by the metropolitan police magistrates and the paid chairman and deputy-chairman of the courts of quarter sessions. (2.) Justices of Middlesex, Surrey, Kent, the City of Westminster, and the Tower, at the time when London was made a county, are justices of the new County of London as long as they reside or occupy property within it. (3.) The chairman of the London County Council and the chairmen of the London Borough Councils are justices of the County of London during their term of office. (4.) The commissioner and assistantcommissioners of the metropoli-

tan police. (5.) The metropolitan police magistrates. (See METRO-POLITAN POLICE COURTS.) (6.) The chairman and deputy-chairmen of the court of quarter sessions of the County of London. By section 42 of the Local Government Act, 1888, the King has power, on the petition of the County Council, to appoint a barrister of not less than ten years' standing to be chairman, or a deputy-chairman, of the court of quarter sessions of the County of London, and any such chairman or deputy-chairman has power to hold the court alone. Courts of quarter sessions are held by these paid magistrates at Newington and Clerkenwell, and the result is that the criminal jurisdiction at quarter sessions of the ordinary justices of London is ousted.

In the City of London the magistrates are the Lord Mayor, aldermen, and the recorder, who are all justices by charter. There is a court of quarter sessions for the City of London, but most criminal cases arising in the city are tried at the Old Bailey, where the recorder and the common serjeant of the city sit as judges of the Central Criminal Court. The Lord Mayor or an alderman, sitting at the Mansion House or Guildhall justice room, has the powers of two justices sitting as a court of petty sessions, and, in addition, nearly all the special powers of a metropolitan police magistrate.

The clerk of the peace is the clerk of the court of quarter sessions. He has the custody of all records and documents belonging to the court of quarter sessions and the justices out of session. In most counties he is also the clerk of the County Council, but he is not so in London.

The coroners in London have the same duties as elsewhere (see CORONER); but the coroner of the City of London also holds inquests in cases of fires in the city, under the City of London Fire Inquests Act, 1881.

The modern county courts have little connection with the county. They are imperial courts of inferior jurisdiction, situated all over the country for the sake of convenience and cheapness.

The Central Criminal Court is a court of the High Court of Justice, adapted to meet the needs of London and the surrounding district. (See CENTRAL CRIMINAL COURT.)

The metropolitan police and the city police are dealt with under POLICE. The standing joint committee of the County Council and the justices has the same duties in London as in other counties, but it has nothing to do with the police.

Before the passing of the Metropolis Local Management Act, 1855, administrative local government in London was in a state of confusion. For many purposes there was no central authority at all, and the district authorities were numerous and diverse, with limited and conflicting powers. For two purposes the corporation of the City of London was a central authority. In 1327, by charter of 1 Edward III., the corporation was granted the exclusive right of erecting markets in the city, and within seven miles of St. Paul's. These rights continue in force till the present day. Many markets have been 1emoved or rebuilt, and all changes in recent times have been made under special acts giving borrowing powers and other facilities which required the assent of Parliament. In former times the city markets were farmed, but since 1771 the corporation has kept them in its own hands. The existing city markets are (1) the London Central Markets in Farringdon Street; (2) Smithfield Hay Market; (3) the Metropolitan Cattle Market at Islington; (4) Leadenhall Market; (5) Billingsgate Fish Market; and (6) the Deptford Foreign Cattle Market. (See LONDON-MARKETS.) There is also the Coal Market, which, however, is not, properly speaking, a market, but a coal exchange. There are several private markets in London not belonging to the city, such as Covent Garden and Spitalfields Markets; but as the crown cannot derogate from its own grant, the corporation must be assumed to have assented to the charters establishing them.

The other matter with regard to which the corporation exercised powers extending far be-yond the limits of the city was the conservancy of the Thames. By a charter of 3 James I., the corporation was granted the con-servancy of the Thames from Staines in Middlesex to Yanleet Creek in Kent. Disputes arose as to the rights of the crown and the corporation in the bed and soil of the river, and a compromise was made under which in 1857 the corporation's rights were transferred to the Thames Conservancy Board. Other authorities which exercised jurisdiction over the whole or most of London before 1855 were the Metropolitan Commissioners of Sewers, the officials under the Metropolitan Building Act, 1844, and the jus-tices. Practically the only district authorities before 1855 were the vestries of the parishes and certain Boards of Improvement Commissioners appointed under private acts.

In 1855 the Metropolitan Board of Works and the Metropolitan

Vestries and District Boards were created by the Metropolis Management Act of that year. The area chosen for the metropolis as defined by that act was practically the area of the present administrative County of London, though the boundaries have been slightly altered under recent acts. It is unnecessary to speak of the con-stitution of the board, or of the vestries and district boards, as they have all been abolished.

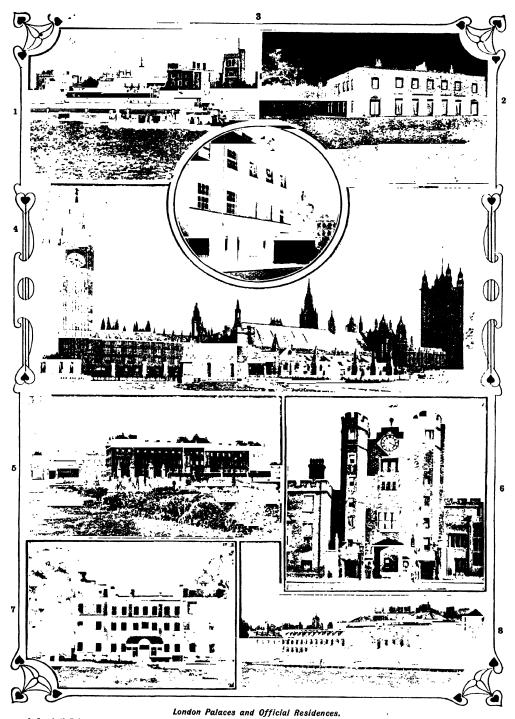
All the powers and duties of the Metropolitan Board of Works were transferred to the London County Council in 1888. vestries and district boards under the Act of 1855 were the local sanitary authorities outside the city, and although their constitution was altered by the Local Government Act, 1894, they continued to exist till the creation of the metropolitan boroughs by the London Government Act. 1899.

The Local Government Act, 1888, made a great change in the government of London. It created the new County of London, and provided it with an organization for non-administrative purposes which has already been referred to. It also created the administrative County of London out of the County and the City of London, and directed that a county council should be elected for that area. The London County Council consists of 118 councillors, 19 aldermen, and a chairman, who may or may not be a councillor or an alderman. There may also be a vice-chairman and a deputy-chairman. The councillors are elected for three yours, the aldermen are elected by the councillors for six years, and the chairman, vice-chairman, and deputy-chairman are elected annually by the councillors and aldermen, but outgoing aldermen may not vote. Women are not eligible as county councillors.

In addition to all the property, powers, and duties of the Metropolitan Board of Works, the London County Council also obtained all additional powers and duties conferred upon county councils generally by the Local Government Act, 1888. Since that date further powers have been conferred upon it by a large number of acts, both local and general. The direct administrative work of the County Council as a cen-tral authority for London in-cludes the following important matters: the construction and maintenance of the main drain-age system of London; the maintenance of ten bridges over the Thames, between twenty and thirty other bridges, the Wool-wich ferry, and the Blackwall tunnel; the maintenance of the Thames embankments: the making of large metropolitan improvements, and contributing to the cost of local improvements; the management of existing parks and open spaces, and the pur-chase of new ones; the manage-ment of the Metropolitan Fire Brigade, and of the county lunatic asylums, reformatory and industrial schools; the clearing of insanitary areas; the building of houses for the working classes, and the erection and management of common lodginghouses; the appointment of coroners, and the provision of places for holding inquests; the purchase, leasing, and working of tramways; a service of passenger steamers on the Thames; the administration of the Contagious Diseases of Animals Acts; the provision of small holdings; the management of lands and houses belonging to the council, of the estimated value of between two and three millions; and the execution of a considerable part of the council's own works by means

of its works department.

The council also exercises large powers of supervision over the work of the local sanitary authorities, and can take action itself when they are in default. It licenses theatres outside the Lord Chamberlain's district; all music halls in London: racecourses within ten miles of Charing Cross; slaughter-houses, cowhouses, and places for carrying on offensive businesses; all factories, magazines, and stores for making or keeping explosives and petroleum; and houses for the reception of children under the Infant Life Protection Acts. It examines and approves plans, and makes by-laws under the London Building Act. It appoints in-spectors of dairies and cow-sheds, inspectors of weights and measures, and for the purposes of the Sale of Coal Act, Shop Hours Act, and Factory and Workshops Acts. It appoints gas examiners, and tests gas and electric meters; and exercises duties with regard to the prevention of floods and the pollution of rivers. It makes by-laws for a number of purposes, and has powers to promote and oppose bills in Parliament affecting London. Its current expenditure is provided for by the county rate, assisted by the Exchequer contribution; and its capital expenditure is met by the creation of London County Council stock and bills. All new borrowing must be sanctioned by Parliament, and the council introduces an annual money bill, which includes all the capital proposed to be borrowed, both for the purposes of the council and of the other local authorities in London, who must all borrow through the council. By the



1. Lambeth Palace (Archbishop of Canterbury). 2. Fulham Palace (Bishop of London) 3. No. 10 Downing Street (official residence of the Premier). 4. Westminster Palace (Houses of Parliament). (Photo by II, N. King.) 5, Buckingham Palace. 6, St. James's Palace, 7, Marl. borough House, (Photo by II, N. King.) 8, Kensington Palace,

Education (London) Act, 1903, the Education Act, 1902, is ap-plied to London. The London School Board is abolished, and the County Council is made the education authority for London, and appoints the Education Committee.

The local or district administrative authorities in London are the councils of the twenty-eight metropolitan boroughs created by the London Government Act, 1899, and the Corporation of the City of London. The metropolitan boroughs are not boroughs within the meaning of the Municipal Corporations Acts. Each metropolitan borough has a council consisting of a mayor, aldermen, and councillors; but the council is really only a district authority created because of the enormous size of London, to exercise those subordinate powers and duties which can best be administered locally, while the real central authority is the County Council. The borough councils are the local sanitary authorities, and exercise nearly all the powers of the London Public Health Act; all powers with regard to the construction and maintenance of sewers and drains, except main drains; and the making, maintaining, lighting, watering, cleansing, and regulating of the streets. They provide and manage baths and wash houses, public libraries, and minor open spaces. They have the powers formerly exercised by Burial Boards under the Metropolitan Burial Acts, and are the local authorities under the Electric Lighting Acts, the Allotment Acts, and for some purposes of the London Building Act. They are the overseers of the poor within their boroughs; and they collect the whole of the rates of London, not only for their own expenses, but for all the other spending authorities in London.

In addition to the powers possessed by the borough councils, the corporation of the city exercises some powers within the city which elsewhere in London are in the hands of the County Council, such as the management of lunatic asylums and reformatory and industrial schools, and the powers as to petroleum, explosives, and weights and measures. They also possess and manage four bridges over the Thames Blackfriars Bridge, Southwark Bridge, London Bridge, and the Tower Bridge, which are all maintained out of the revenues arising from the Bridge House Estates. The city markets have already been referred to; and the corporation have also provided, out of the proceeds of an old duty on grain, certain open spaces outside the County of London.

but within twenty-five miles of it, the principal of which are Epping Forest and Burnham Beeches. The poor in London or provided for, as in the rest of the country, in parishes and unions, under boards of guardians; but since 1864, and more fully since 1867, some special provisions have been made with regard to London as a whole. Certain expenses have been treated as common expenses, and paid for out of the Common Poor Fund, raised by a uniform rate over the whole of London; and certain services, such as the provision of hospitals for fever, smallpox, and diphtheria patients, have been transferred to a central authority, called the Metropolitan Asylums Board. (See Asylums Boards.)

The water supply of London has been in private hands until quite recently. (See METROPOLI-

TAN WATER BOARD.)

MARKETS. - There are nine principal markets in London. of these - viz. Billingsgate, the London Central Markets, and Leadenhall Market-are within the city, and belong to the cor-poration, who, under a 'charter in Parliament' granted by Edward III. on March 6, 1326, are the market authority for London. The other six-viz. the Metropolitan Cattle Market, the Foreign Cattle Market (which, with a smaller fish market at Shadwell, are also under the control of the corporation), Spitalfields, Covent Garden, Stratford, and the Borough Markets-are in the County of London. Spitalfields Market was established under a charter granted by Charles II., dated July 29, 1682, and the rights in it are at present leased to Mr. Robert Horner for a term of years at an annual rent of £5,000. Under the provisions of an Act of 1902, however, the corporation has acquired the site of the market, at a cost of £176,750, and is now negotiating for the purchase of Mr. Horner's rights and interests in the undertaking. The Stratford Market was established in 1879, under an Act of Parliament, by the Great-Eastern Railway Company for the sale of the produce carried to London over their system. 'The Borough Market, for fruit and vegetables, is also a parliamentary market. It is carried on by trustees, who apply the profits to the reduction of the poor-rate of the par-ish of St. Saviour, in which it is situated. Billingsgate is the most ancient market in London. It is mentioned in a proclamation dated 1297, and it was given in evidence before the Royal Com-mission of 1893 that it was used for the sale of fish a thousand years ago. The first Act of Parliament relating to the market was passed in 1699, by which it was made a 'free and open mar-ket for all sorts of fish whatso-ever.' The total sum expended by the corporation since 1849 in the enlargement of the market has been £318,981. The supplies of fish to Billingsgate arrive both by land and water, and in 1904 these amounted to 113,388 tons by land and 61.218 tons by water. Smithfield was an existing market in 1253, and from 1614 to 1855 was utilized for the sale of live stock. In the last-named year it was removed to its present site at Islington, and became known as the Metropolitan Cattle Market. The new market occupies a site of about 75 acres, and cost £504,842. It finds employment for 1,600 persons, and in the market area two blocks of model dwellings. accommodating 124 families, have been erected. The number of cattle consigned to the market in 1904 was 606,179, and the receipts from all sources in the same year amounted to £19,511. scheme is at present under the consideration of the corporation for reducing the area of the market, and for abolishing the private slaughter-houses there and substituting public abattoirs. The Foreign Cattle Market at Deptford was opened in January 1872. 'for the landing, reception, sale, and slaughter of foreign animals,' with a view to the prevention of the introduction into Great Britain of contagious diseases, and was enlarged in 1881. sum of £379,500 was expended by the corporation in acquiring the site of 30 acres and in constructing the market, which includes twelve lairages, capable of accommodating 5,000 cattle and 22,000 sheep; 66 slaughter-houses and chill rooms with a holding capacity of nearly 1,000 sides of beef. The number of animals landed at the market during 1904 was 240,534. The London Central Markets stand partly on the site of old Smithfield Market, and were opened in December 1868. They comprise a meat market, a poultry and provision market, and a general market with poultry and provision, in-land fish and fruit, vegetable and flower sections. The last-named section took the place of Farringdon Market, which had become inconvenient and incommodious, and was discontinued in June The meat market, which 1892. affords direct and indirect employment to 9,000 persons, and the ercction of which involved a capital expenditure of £1,075,000, is believed to be the largest deadmeat market in the world. It is strictly wholesale except on Saturday afternoons, when the 'People's Market' is held. The

poorer classes from all parts of London attend by thousands on these afternoons, when a large refail business is transacted. The total expenditure on the Central Poultry and Provision Market amounts to £332,000, and on the various sections of the general market to £533,000. The official returns show that during 1904 the total weight of fish, meat, poultry, provisions, and general produce delivered at the Central Markets was 418,199 tons, of which 153,844 tons came from America 85,588 tons from Australia and New Zealand, and 65,243 from general foreign' sources. The toll on this quantity was £46,904, while the receipts from all sources in 1903 were £136,757. Leadenhall Market has existed from very early times, and was an ancient prescriptive market for the sale of meat, poultry, game, and provisions. An Act of 1879 abolished the then existing market, and empowered the corporation to improve the site, lay out and form new streets, and construct a new market for the sale of 'meat, fish, and poultry and other provisions.' This new market, with its approaches and avenues, cost £247,800, and was opened in December 1881. No record is kept of the supplies to this market. The corporation have spent upon their markets, from time to time, a sum of not less than £3,500,000. Covent Garden Market is held by the Duke of Bedford under a charter granted by Charles II. to the then Earl of Bedford, and under a regulating Act of 1828. It has long ceased to be the filthy and noisy market held close to the dwellings of the great' described by Macaulay. The present owner has, at the cost of many thousands of pounds, improved and extended the market, and has provided lofty and commodious buildings in which what is probably the largest wholesale business in fruit, both home-grown and foreign, vege-tables and flowers, in the world is carried on daily. As the market is private property, no statistics as to the annual volume of its trade are published, but it is understood that the net receipts A word or two should be said about Columbia Market, one of the most elaborate pieces of Gothic art in the metropolis. This was the gift of the Baroness Burdett-Coutts to the Bethnal Green district, and was opened in 1869. It is believed to have cost 250,000, and was intended to place within the reach of the dense population around it supplies of provisions, and especially of the place within the reach of the dense population around its upplies of provisions, and especially of the provisions and especially and at of fish, of better quality and at more reasonable prices than they could be procured at through the small dealers and hucksters who had previously monopolized the trade. But the grand conception, splendidly undertaken and munificently carried out, has been a disastrous financial failure; and though one part of the building is still in use as a vegetable, hay, and straw market, the great market-hall and its chief adjuncts are practically perishing for lack of use,

TRAFFIC.—The problem of London traffic presents two broad aspects. The one is concerned with facilities for getting from the outside to the inside of the metropolis, and vice versa; and the other with progression in the main thoroughfares of the central districts. A third question which is involved in the general problem is the constitution of a tribunal or authority, similar, it may be, to the Rapid Transit Commission of New York, which shall be especially charged with the coordination, the control, and the regulation of the whole of the traffic projects in and for London. The solution of these questions was committed to a royal commission. The state of things existing but three or four years ago had become intolerable. The means of what has now come to be spoken of as 'intra-mural transportation' were hopelessly inadequate for the necessities of the population under the present conditions of London life and labour. Parliament was therefore appealed to, and on Feb. 10, 1903, a royal commission was appointed to inquire into the whole subject of London traffic. The reference was framed in the widest possible terms. It directed the commissioners to inquire into the means of locomotion and transport in London, and to report (1) as to the measures which they deem most effectual for the improvement of the same, by the development and interconnection of railways and tramways on or below the surface, by increasing the facilities for other forms of mechanical locomotion, by better provision for the or-ganization and regulation of vehicular and pedestrian traffic, or otherwise; and (2) as to the desirability of establishing some authority or tribunal to which all railway or tramway construction of a local character should be referred, and the powers which it would be advisable to confer upon such a body. The commissioners issued their report on July 20, 1905, the main conclusions of which are briefly stated here. The population must be taken out of London in many directions at rapid speed, frequent intervals, and cheap rates, as to rehouse them 'on site' is

far too costly. The commissioners therefore recommend the construction of two main avenues through London, each 140 ft. through London, each 140 ft. wide—one, from east to west, to connect Bayswater Road with Whitechapel; and the other, from north to south, to connect Holloway with the Elephant and Castle. These avenues are to have four lines of tramways on the surface, and four lines of railway beneath, both to be worked by electricity, so that express trains and local stopping trains may be run on different rails. The total cost is estimated at 24 millions sterling. The widening of several other streets, a viaduct at Blackfriars Bridge, and a bridge across the Strand are among the other recommendations. The commissioners advise a great extension of tramways in London and in the suburbs; through connection between the different tramway systems; that provision be made for running outside as well as inside the county, and that the power of veto presently exercised by local authorities be abolished. commissioners recommend the establishment of a traffic board, which should keep in touch with all the local authorities in Greater London, and maintain a friendly attitude towards them and to-wards all companies working railways, tramways, or other means for facilitating locomotion and transport.

A few figures will serve to illustrate the nature of the problem. Every day in the week, except Sunday, there enter the central districts, by railway, tramway, and omnibus, before half-past ten in the morning, some-thing like half a million of people from north and south of the Thames. For all these people, of course, cheap and rapid loco-motion is an absolute necessity. It is estimated that 15,000 tram cars run daily in London, most of them having their termini just on the boundary of the central area. The number of passengers area. The number of passengers carried in the London County Council cars alone amount to about 200,000,000 annually. The London roads are traversed, it is impossible to say how many times daily, by 4,000 omnibuses, and they convey annually, it is stated, 500,000,000 persons. There are, in addition, between 7,500 and 8,000 hansom cabs, and about 4,000 'four-wheelers,' which are more or less constantly plying for hire in the streets of the metropolis. When to these figures there are added the almost countless carts, vans, drays, lorries, and trolleys which use the streets, some idea may be gathered of the daily volume of vehicular traffic within the metropolitan area, At the Bink, for instance, nearly 800 vehicles pass each hour of the day. Through Oxford Street there is an hourly traffic of 550 vehicles. Some 500 vehicles per hour pass the junction of Oxford Street and Tottenham Court Road, while a still greater traffic goes along what is called the Piccadilly and Charing Cross route from Hammersmith to the city. And all this traffic has grown up while, with a few notable exceptions, the streets of London have remained as narrow and as irregular as they were a hundred years ago.

Take another phase of the problem, which is concerned more perhaps with pedestrian than with vehicular traffic. Sixty years ago the number of railway stations in London was eight. These were Euston, Paddington, Addison Road, Nine Elms, Bricklayers' Arms, London Bridge, Shore-ditch, and Fenchurch Street. To-day, it is estimated, there are nearly 300. Within the area of Paddington, Addison what is known as Greater London there are 530 railway stations, and this number will be increased to upwards of 600 when the under-ground or 'tube' railways which are in course of construction are opened in the next year or two. The length of the trunk lines, local lines, local joint lines, and tubular lines, including those now building, in Greater London There are exceeds 630 miles. within the metropolitan area 22 stations which may be regarded as termini, and into these there pour daily no fewer than 4,697 trains, of which 4,252 represent suburban traffic. The underground and surface railways operating in London, acting as distributers and feeders of the trunk lines, carry not less than 600,000,000 passengers per annum, and it has been estimated that the new accommodation being provided will afford greater facilities, to an extent ranging from 400,000,000 to 450,000,000 additional passengers a year. It will thus be seen that the problem, in whichever aspect it is regarded, is one of enormous proportions, intricacy, and complexity.

The main difficulty, or at least one of the main difficulties, in so far as 'intra-mural transportation' is concerned, is the getting of the passengers who arrive in the sub-urban trains at the scattered termini to their work in the central area. It is expected that this difficulty will be largely removed when the new 'tube' railways are opened. The enterprise, which was developed under the control of the late Mr. Charles T. Yerkes, who built and successfully 'operated' the electric tramways in Philadelphia and Chicago, is one of great magnitude. It involves

the construction of three new lines of tube railways (Baker Street and Waterloo; Great Northern, Piccadilly, and Brompton; and Charing Cross, Euston, and Hampstead); the electrification of the existing District (Underground) Railway; the provision of a new line of electric surface railway between Edgware and Hampstead; and the working, in conjunction with a portion of the scheme, of the London United Tramways (1901) Co., Ltd. The Baker Street and Waterloo railway, which runs from Paddington to the Elephant and Castle, was opened in 1906. It is 5 m. long, and has two running tunnels of a diameter of 11 ft. 6 in. The Great Northern, Piccadilly, and Brompton line, which has a length of 10 m. and tunnels of 11 ft. 81 in. diameter, will run from Finsbury Park to Earl's Court, and, by a branch line, from Holborn to the Strand. northern and eastern sections of the railway will form a link between the Great Northern and Midland termini at King's Cross and St. Pancras and the west of London, and the western section will provide a route from the far west of London to Piccadilly. At Piccadilly Circus it will make connection with the Baker Street and Waterloo railway, and at Cranbourne Street with the Charing Cross, Euston, and Hampstead railway. The greater part of the has been driven, and the line will probably be opened during 1906. The Charing Cross, Euston, and Hampstead railway, with its northern overground extension from Edgware to Hampstead, will give communication between Edgware, Hendon, Hamp-stead, Highgate, Kentish Town, and Camden Town and the city. At Euston it will be able to exchange traffic with the City and S. London; at Oxford Street it will connect with the Central London railway, and at Cran-bourne Street with the Great Northern, Piccadilly, and Brompton railway. The total length of the line is slightly over 8 m. The Edgware and Hampstead surface light railway, over which the trains of the Charing Cross, Euston, and Hampstead railway will travel to Edgware, is about 6 m. long. The power for working the three underground lines will be supplied from the District Railway Company's generating station in Chelsea. The total cost of these various undertakings is estimated at not less than £15,000,000, and it is understood that the whole scheme will be in operation in 1906 or 1907. London will then be in possession of the largest and most co aprehensive system of underground and tube railways in the world. The un-

derground as distinguished from the tube railways are the Metropolitan and the District, which were electrified in 1906. The first were electrified in 1906. The first tube railway was the City and South London, which runs from Clapham Common, on the south, to the Angel, on the north of the river, with an extension to King's Cross and Euston which was under construction in 1906, and will probably be opened in 1907. This was opened in November 1890. The length is just over 6 m., and the capital of the company £2,598,000. The second was the Waterloo and City line, with a capital of £720,000—a small tube running from under the main terminus of the London and Southminus of the London and South-Western railway at Waterloo to the Bank. The Central London, or the 'Twopenny Tube,' as it is popularly called, was the third. This, with a length of 6 m. 5 fur., has a capital of £4,200,000, and runs from Shepherd's Bush to the Bank, with many intermediate stations. The fourth tube railway working is the Great Northern and City, which was opened in February 1904. It has a length of 31 m., from Finsbury Park to Moorgate Street, and an authorized extension of a quarter of a mile to Lothbury (City). The capital of the company is £3,113,000. The fifth is the Baker Street and Waterloo line. The amount of capital invested in tube railways now in operation (including the last) is £10,631,000. A sum of between £15,000,000 and £16,000,000 is represented by those in course of construction, and of nearly £4,000,000 by those authorized but not yet begun, or an aggregate capital of nearly £30,000,000.

Two further similar railways were authorized by Parliament in the session of 1906. The more important is known as the City and North-East London railway, which is to be constructed partly in tube and partly in the open. Its city terminus is at the Monument, whence it runs to Hackney Road in tube. It then comes to the surface, and, running through the densely-populated district of West Ham, proceeds to Waltham Abbey, its county terminus. The route thus followed is almost precisely that suggested by the joint committee on tube railways. The total length of railway is nearly a dozen miles, and the capital involved about £4,000,000. rival or competing scheme, following the same route from the city to Hackney Road, and then branching off and terminating at Tottenham, where the County Council has a large building estate, was promoted, but the bill did not proceed to a second reading. It is understood, however, that the bill will be reintroduced in the session of 1907.



Traffic Map of London.

The second railway authorized is intended to serve the western side of the county. As far back as 1899 a company was authorized to construct a tube railway from Cricklewood to the Marble Arch. The scheme was, for a variety of reasons, not proceeded with, and the promoters came to Parliament in 1906 for an extension of the time originally granted for the construction of the railway. They also sought at the same time powers to extend the proposed railway from the Marble Arch to Victoria, an extension specifically recommended by the Traffic Commission. The proposal was opposed by the County Councils of London and Middlesex, who were jointly promoting a bill for the construction of an electrically-worked surface tramway between Cricklewood and Victoria, where it would be linked up with one of the southern tramway services of the London County Council. The tramway bill was, however, rejected by the committee, and the railway bill, with the proposed extension, was passed by both Houses. The estimated cost of the whole scheme is between two and three millions sterling.

Another enterprise which is working towards the solution of some of the present difficulties is the extension of the electric tram-car service. There are ap-proximately in the County of London 116 miles of tramways open for traffic. Over a third of this distance the service is worked by the County Council: 48 miles odd are leased by the council, and about 28 miles are owned by tramway companies. This gives one mile of single tramway for every 22,500 of the population, as compared with one mile for 3,942 persons in Manchester, one for 5,244 in Glasgow, and one for 6,781 in Liverpool. In the case of New York there is one mile of tramway for every 2,500 or 3,000 people; and in all these cities the lines are electrically worked, whereas in London only onequarter of its tramways has been electrified. The exact length of electric tramways in the county in 1904 was 27 route miles, equivalent to 54 miles of single line. This mileage has since considerably been increased. These are all on the south side of the river, and are worked by the County Council on the conduit system. The cost of construction is about £28,000 per mile of street, double line; but though this is something like 33 per cent. greater than the cost of the overhead system, it is claimed that the durability of the conduit system is very much greater. The total cost in connection with the track work alone of the lines

so far converted to electric traction amounts to over £800,000. The number of electric cars now in use is over 300. They are of two types-the double-deck bogie car, carrying 66 passengers; and the double-deck single truck car, carrying 56 passengers. service from the termini is a 21minutes one, though on certain lengths of route it becomes practically little more than a one-minute service. It is intended to proceed with the conversion of the horse tramways as the various sections within the county are acquired by the County Council. A great scheme of electrification is in progress on the north side of the river, and extending beyond the county boundary into Middlesex and Hertford-shire. The area of the entire enterprise extends from Willes-den in the west to Walthamstow and Woodford in the east. The London county boundary practically forms the southern frontier, and towards the north the system will be carried as far as Watford on one side and Cheshunt on the other. At present there is no connection at any point between the northern and southern serv-But the County Council have obtained powers to construct tramways across Putney Bridge and Vauxhall Bridge, for the purpose of linking up the two services at these places; and they have completed the building of a shallow subway, through which trams run, for the purpose of forming a connection north and south, from Holborn to the Strand, and thence, under the Strand and Wellington Street, to the Victoria Embankment. Powers were sought in 1903, and again in 1905, to carry the tramways which now terminate at the southern ends of Westminster Bridge and Blackfriars Bridge over these two bridges and along the Embankment, where a junction was to be formed with the subway tramways. The advan-tages of such a scheme were ob-vious. The great and dangerous congestion of traffic at the southern termini would have been sensibly relieved; the disgraceful and debasing scenes of men, women, and children struggling and fighting to get on board the cars as they came up to these stopping places would have been put an end to; and a practically through route would have been afforded from the southern to the northern boundary of the county. Parliament, however, on both occasions, refused its assent to these proposals. The County Council again introduced a bill, embodying almost identically the same scheme, in the session of 1906. On this occasion they were able to quote the recommendation of

the Traffic Commission in favour of over-bridge tramways, and the bill received the assent of both Houses. It will, however, be several years before the scheme completed, as Blackfriars Bridge has to be widened for the purpose of carrying the double line of tramway. The estimated cost of the tramway construction work alone is something between £80,000 and £90,000. The shal-£80,000 and £90,000. The shallow tramway from Holborn to the Embankment is constructed a few feet beneath the surface. The route is three-quarters of a mile in length, and for two-thirds of the distance it comprises a cut and cover' tunnel measuring 20 ft. in width and 14 ft. in height. In passing under the Strand and Holborn, the tramway, which is worked on the conduit system, is in twin tubes, and access to intermediate stations is gained from the street refuges. The cost of this important work-an enterprise that in a smaller city would have attracted world-wide attention-is placed at £300,000. The advantages claimed for shallow tramways are that the equipment and working expenses are considerably less, and that the tunnels would include subways for pipes, mains, cables, wires, etc., which would avoid the frequent and irritating interruption of traffic caused by the breaking up of the streets for the laying and repairing of pipes. A considerable extension of the tramway system was sanctioned by Parliament in 1906, and further large proposals in the same direction are to be submitted in the session of 1907.

In June 1905 the County Council inaugurated, at an expenditure of nearly £300,000, a municipal service of passenger steam-boats on the Thames—a great highway which, for this purpose, has been lying derelict for several years. The service affords new facilities for connection between the north and south sides of the river. The service was fully appreciated by the public during the finer months of the year, but proved less successful in winter; and at its meeting in August 1906 the County Council decided to suspend the service from October till the spring. The council is also agitating for a new bridge across the Thames between Waterloo and Blackfriars Bridges; and it is carrying out, at a cost of millions of money, immense street improvements in the straightening and widening of thoroughfares such as the Strand and Fleet Street and Piccadilly, and the construction of new broad arteries for the purpose of giving additional accommodation for the street traffic. The opening (October 1905) of the

thoroughfares of Kingsway and Aldwych completed the principal part of the great Holborn and Strand improvement scheme. The omnibus companies, though somewhat belatedly, are begin-ning to take a share in the provision of more rapid means of Motor omnibuses are transit. being gradually placed upon the streets in various directions. The London Limited Electric Tramways Company, who bring millions of passengers annually to the county boundary, are con-tinually extending their undertaking on the western side of the metropolis. Several of the railway companies which have to deal with a vast suburban traffic have electrified, or are in process of electrifying, the lines on which it is carried; while other companies, with a perfect tangle of lines and several hundreds of stations within the limits of the county, have the question of electrification under consideration. The only direction in which nothing is being done in the way of improvement is in the regulation of the street traffic. An infinite variety of suggestions has been made towards this end. The separation of the fast from the slow traffic; the diversion of heavy traffic; the adoption of alternative routes; the fixing of point'stations or stopping-places for omnibuses; the construction of suspended railways; doubledeck streets; great avenues run-ning to all points of the compass; circular roads around the whole metropolitan area; the building of subways for passengers at all points where streams of vehicles converge, so that they may cross the thoroughfares without the necessity of 'holding up' the traffic; and of subways under the footpaths for pipes, etc., so as to reduce to a minimum the most fruitful cause of obstruction, the opening of the streets—these are among the proposals which have been advanced for consideration.

It is understood that Parliament will be asked to deal with this complicated traffic problem during the session of 1907. An official statement has emanated from the Board of Trade to the effect that the government will then introduce a bill on the subject, and it is expected that one of its main proposals will be the creation of a Traffic Board on the lines of the recommendation of the Royal Commission.

LONDON PORT is still, as it has been for at least two centuries, the greatest port in the world in respect of the amount of shipping and of goods which enters it. The total shipping entering it is, roughly speaking, one-fifth of the total shipping of the United

Kingdom; while the value of the commodities imported at the port is, approximately, one-third, and of the exports about one-fourth, of the total value of the imports and exports of the whole of the country. The total value of the imports increased from £169,564,000 in 1901 to £181,061,250 in 1905, and the exports from £92,600,200 in 1901 to £103,943,750 in 1905. In the last-mentioned year 3,241 vessels, of 2,121,746 tons, were registered as belonging to the Port of London. A total of 27,195 vessels engaged in foreign trade and coasting, with a tonnage of 17,188,947, entered the port in 1905, and 27,692 vessels, with a tonnage of 16,230,866, cleared it. The complaint made, both by shipowners and by traders, is that, though the conditions of modern commerce have been revolutionized, nothing has been done to adapt the port to the new necessities, and that the trade is, as a consequence, going to those ports where greater facilities for the accommodation of vessels and for the rapid loading and unloading of cargoes are offered. It is urged that, while continental ports such as Hamburg, Antwerp, and Rotterdam, and home ports such as Liverpool, Manchester, Glasgow, Bristol, and Southampton, are making great improvements and developments to meet the changed conditions brought about by, among other things, the increased size and draught of ocean-going ships, no similar effort is being made in the case of the Port of London. chief reason for this failure would seem to lie in the division of control which distinguishes the Port of London from the other principal ports both of this country and of the Continent. Liverpool has its Mersey Docks and Harbour Board, and Glasgow its Clyde Navigation Trustees, representative bodies which excrcise sole control over those respective ports. But in the case of London no fewer than fiftysix authorities, some of them deriving their locus from mediæval times, are concerned in one way or another in the management of the port, without any single one of them possessing complete power over the river, the port, navigation, shipping, or other services. The result is that none of the authorities has either the necessary funds or the necessary powers to carry out such a comprehensive scheme for the improvement and development of the river and port as is absolutely essential if it is successfully to compete with its rivals. The demand for some alteration of the existing unsatisfactory state of things became so urgent that

in June 1900 a royal commission was appointed 'to inquire into the present administration of the Port of London and the water approaches thereto; the adequacy of the accommodation provided for vessels, and loading and unloading thereof; the system of charge for such accommodation, and the arrangements for warehousing dutiable goods; and to report whether any change or improvement in regard to any of the above matters is necessary for the promotion of the trade of the port and the public interest.'
Two years later the royal commission made their report. Their recommendation, main upon which all their other suggestions hinged, was that the whole of the tidal river and the undertakings of the three dock com-panies should be placed under the sole control of a new port authority, consisting of forty representatives of the London County Council, the City Corporation, the Admiralty, the Board of Trade, shipowners, traders, and other interests. It was also recommended that this port authority should spend £4,500,000 on dock extension, and £2,500,000 for the deepening of the river, and that the interest on the port stock to be issued for the purchase of the docks and the payment for the new works, estimated at between £30,000,000 and £40,000,000, should be guaranteed by the London County Council. A bill embodying, in the main, the recommendations of the commission was introduced by the government in the session of 1903, and referred to a joint-committee of the two houses. The bill was carried over till the session of 1904. but in consequence of the opposition it evoked, the government dropped it. The London County Council, however, promoted a bill in the session of 1905, which, though largely a transcript of the government bill of 1903, differed materially from that measure in the provisions relating to the compensation of dock debenture holders and the financial powers and constitution of the port authority. The bill was thrown out in April, so that it may be said of the Port of London problem, as of the London traffic problem, that it still awaits solution. A statement has, however, gained currency to the effect that the government intend to introduce legislation on the subject in 1907, and that a Port Trust will be proposed, which is to be commercial rather than municipal in its character.

LONDON UNIVERSITY, South Kensington, S.W.—The history of the foundation of the University of London is a little involved. In 1827 an appeal for

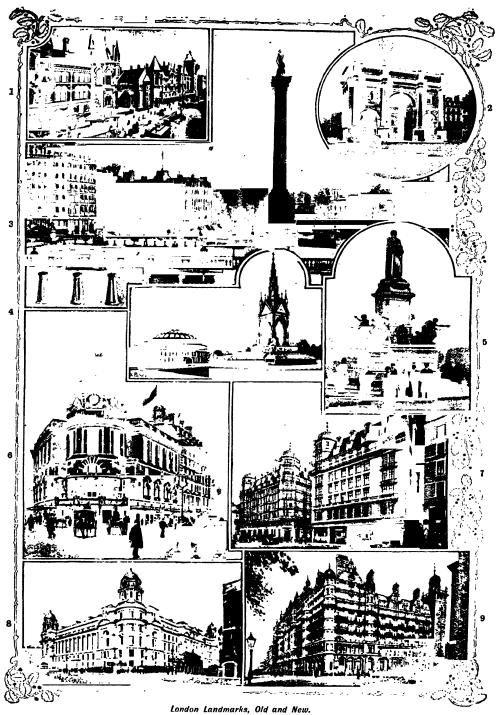
funds was made for a university open to students of every religious belief, when no less than £160,000 was subscribed. foundation-stone of the institution in Gower Street-known in tits early days as the London University, and now known as University College—was laid in the same year by the Duke of Sussex, and in the following year closures in the feasible of early classes in the faculties of arts. law, and medicine were opened. Owing to the opposition of va-rious chartered bodies and of the promoters of King's College, which was opened (1831) to provide an education of university character combined with instruction in the doctrines of the Established Church, it was not till 1835 that the Privy Council decided to incorporate the new institution under the name of London University College, and to establish a distinct examining body to be called the University of London, which should have the power of conferring degrees on students of approved schools and colleges without the imposition of any religious test or disqualification whatever. The compromise was willingly accepted by the promoters of the original institution, and on the same day (Nov. 29, 1836) charters were duly granted by King William IV. to London University College and to the University of London, provision being made that the university should be under the general control of the government. Only the main events in the history of the new university since its incorporation can here be mentioned. In 1851 the university was given the privilege, already enjoyed by Oxford and Cambridge, of granting degrees in medicine. Four years later, by the charter of 1858, the connec-tion between the university and its affiliated colleges was practically abolishe I, the examinations, excepting only those in medicine, being thrown open to all come:s. Special examinations for women were inaugurated (1867), and in the same year the members of Convocation, consisting of graduates of three years' standing, were given the privilege of sending a representative to Parliament, Robert Lowe being elected (1868), Sir John Lubbock (1880), and Sir Michael Foster (1900). The new buildings in Burlington Gardens were inaugurated by Queen Victoria (1870). The special examinations instituted for women met with little success, and in 1878 it was decided that every degree, honour, and prize awarded by the university should be made accessible to students of both sexes on perfeetly equal terms. This was the last event of general interest be-

fore the reconstitution of the university in 1900.

Towards the close of the 19th century a feeling arose, and gradually gained strength, that, while the work of examining might be allowed to continue unimpaired and unrestricted, a great deal more might be done in the direction of supervising the teaching of university character in colleges in or near London. In 1892 a royal commission, generally known as the Gresham Commission, with Earl Cowper as its chairman, inquired into all questions relating to the university work in London; and finally, after prolonged and vigorous controversy, the University of London Act was passed (1898), by which commissioners were appointed whose chief duty was to frame statutes which were signed and sealed by the commi. sioners (Feb. 13, 1900) and approved by Parliament (June 29 following). The university now consists of the chan-cellor, the existing fellows for their respective lives, the senate, the graduates, and the students. Professor A. W. Rücker, M.A., D.SC., F.R.S. (now Sir Arthur Rücker), was appointed principal of the university (1901). The former examining work of the university has been continued without any break of continuity, the senate being advised in this part of its work by a council for external students. But since the reconstitution a great change has taken place in the relation between the university and the various colleges and institutions within the prescribed circle of thirty miles round the university. Any such public college or institution, in which the teaching is of university character, may apply for recognition as a 'school of the university,' whose students, known as 'internal students,' are allowed, after they have passed through the courses of study prescribed, to enter for the internal examinations, which are generally distinct from the external examinations. The courses of study and the teachers of these colleges are also recognized, provided they fulfil the prescribed conditions. To meet the needs conditions. To meet the needs of certain institutions, such as the London polytechnics, whose work is only in part of university character, it was provided that teachers in these institutions might be recognized, and that students who had attended the prescribed courses of study under such teachers should enjoy all the privileges of 'internal stu-dents.' The 'schools' of the university include University and King's Colleges, the medical schools attached to the eleven great hospitals of London, the Royal College of Science, the

Central Technical College, the London School of Economics, seven theological colleges, three colleges for women—viz. Bedford College, Holloway College, and Westfield College—and one agri-cultural college, Wye College— the last being the only school of the university situated beyond the appointed radius. The senate. acting on the advice of an academic council, is now able to oxercise a strong and healthful influence over the higher education of the metropolis. Arrangements have been made whereby teachers in the university are consulted, through the university boards of studies, with regard to courses of study and schemes of examination, and they thus exert a far greater influence over the study and examination of their own students than was possible under the old conditions. The good effects of the reconstitution have shown themselves in many other ways. University work in all parts of London has been stimulated or quickened, and the university is now taking its proper place as the head of a great academic system. Complete schemes of study in all subjects, including intercollegiate courses in the higher branches, have been organized. University have been organized. Omtendaded College will probably be incorporated with the university very hard to special act. The shortly by a special act. The Worshipful Company of Goldsmiths have presented to the university their great institution at New Cross known as the Goldrmiths' Institute. Schemes are on foot for the establishment of two new colleges at S. Kensington-one for preliminary and intermediate medical studies, and the other for higher technological work. A research laboratory in physiology has been opened in the university, and arrangements have been made for the education of university candidates for com-missions in the army. The important work of the London University Extension Society has been transferred wholly to the university, which also undertakes the examination and inspection of secondary schools, these departments being under the control of a special board. It may be of interest to note that in 1905 there were 750 recognized teachers and 2,600 registered internal students.

Degrees are now given both on the internal and external sides in arts, divinity, science (including degrees in agriculture, conomics, engineering, and veterinary science), medicine, music, and laws, special care being taken that the standard of the examinations shall be maintained under the new conditions, and that the standards at the corresponding



Law Courts. (Photo by York.)
 Marble Arch.
 Trafalgar Square, looking towards Westminster. (Photo by G. W. Wilson.)
 Albert Memorial and Albert Hall.
 New Gladstone Statue, Strand.
 The New Galety Theatre, Strand and Aldwych.
 Strand improvements: the Savoy Hotel extension.
 New War Office.
 Hotel Russell.

internal and external examinations shall be equivalent. Exemption from matriculation is granted to students, both on the internal and external sides, who have passed examinations accepted by the senate as equivalent; and graduates of other universities are allowed to enter on the internal side for the higher degrees of the university without first taking one of the lower degrees. Research has been much stimulated by the system now in vogue of granting higher degrees in the various faculties, chiefly on theses embodying the results of the candidates' original work. The degrees of the University of London have always enjoyed a good reputation both for the high standard of knowledge which has always been demanded, and for the strict impartiality of the examinations; and there is every reason to believe that organization of the teaching and research on the internal side will add considerably to its prestige

and influence. LIVERY COMPANIES.-The Livery Companies, one of the peculiar appurtenances of the City of London, are the successors of the craft guilds. The guilds were voluntary associations, governed by ordinances of their own framing, which regulated, and to some extent controlled, the trades carried on in the city. They appointed overseers to inspect the wares produced or sold, and umpires to adjudicate in cases of dispute between masters and workmen. In the reign of Edward III. charters were granted to these voluntary associations, and their ordinances formally recognized and enrolled in the Lord Mayor's court. Each company assumed a distinctive livery, and it is to this fact that they owe their present name, though there is no reference to them as 'livery companies' in the original charters. The companies continued for some time to exercise the functions of the guilds; but their decay as trade organizations began in the early part of the 16th century, and during the last four hundred years they have generally been mainly identified with acts of hospitality and benevolence. A few of them, however, and most notably the Worshipful Company of Clothworkers, have remained faithful to their former associations, and still devote large sums to the advancement of the industries over which they once exclusively presided. The ordinary constitution of a livery company embraces the master, wardens, the court of assistants, a livery, and a general body of freemen. The master was originally nothing more than the upper warden; and the Fishmongers

and Goldsmiths still retain this principle, and term their chief executive officer prime warden. The livery was so called from the ancient practice of the periodical delivery of clothing to the members of the company. A liveryman of the guilds who resides within twenty-five miles of the city borders has a vote in the parliamentary elections for the city. The number of such voters is between 7,000 and 8,000. There are seventy-six 'city companies,' to adopt their everyday designa-tion. Twelve of these are known as the 'great' companies, the remainder as 'minor' companies.

The majority of the 'great' companies are possessed of immense wealth. Taking them in the order of civic precedence, their total trust and corporate income in 1904 was as follows:—Mercers (first charter, 1393), £111,000; Grocers (1428-9), £38,000; Drapers (1384), £78,000; Fishmongers (1272), £58,692; Goldsmiths (1327), £59,000; Skinners (1327-8), (1527), £59,000; Skinners (1527-5), £44,000; Merchant Taylors (1299-1300), £50,000; Haberdashers (Henry VI.), £58,000; Salters (Edward III.), £22,000; Ironmongers (1464), £23,000; Vintners (1364), £11,000; Clothworkers (1527-8), £60,000. The wealthiest of the 'minor' companies are the Loothersullers £23,000. Brewers Leathersellers, £23,000; Brewers, £17,500; Saddlers, £12,200; and Carpenters, £11,638. Much of this wealth is devoted to educational purposes. The City and Guilds of London Institute, for the advancement of technical education, was founded in 1877 by the companies, who contribute the larger part of its annual income of £35,000. The Clothworkers' Company promoted the establishment of Yorkshire College, Leeds, now merged in the Yorkshire University. Morchant Taylors' School was founded in 1561 by Sir Thomas White and the Court of the Merchant Taylors' Company, who are to-day the governing body of the school. The companies largely subsidize the universities of Oxford and Cambridge in the matter of exhibitions; the Drapers' Company provide a large number of scholarships at the East London Technical College; and between thirty and forty schools in London and the provinces are supported to a considerable extent out of the private income of the companies. It is estimated that they spend about £75,000 a year on educa-tional purposes. They contributed £13,000 to the establishment of the Royal College of Music; and during the ten years 1869-79 the London Hospital received £26,500 from the Grocers alone. The companies expend annually about £75,000 of their trust income on the support of their almshouses and in the relief of poor mem-

bers, and many thousands a year on benevolent and public objects of a general character. They possess thirty-eight halls in London, the rateable value of which is placed at about £60,000 a year. The value of their plate (which includes some of the finest and rarest specimens of antique silver known to connoisseurs) and furniture is estimated at £320,000: while the capital value of the whole of their property was, in 1880, put at the figure of £15,000,000. A royal commission was appointed in 1880 to inquire into the circumstances and dates of the foundation of the city livery companies, the objects for which they were founded, and how far those objects were now being carried out. The commissioners reported in 1884, but the recommendations they made have never been given effect to by Parliament. See Herbert's Hist, of the Twelve Great Livery Companies of London, Hazlitt's Livery Companies of the City of London (1892), and Report of the Royal Commission (5 vols. 1884).

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London County Council.

London, a British first-class battleship of 15,000 tons, launched in 1899. The name has been borne by ships that were present at the battle of Lowestoft (1665 the 'St. James' Fight' (1666 the battle of Solebay (1672, Bridport's action (1795), the battle of Copenhagen (1801), the capture of the Marengo and La Belle Poule (1806), and the bombardment of Sebastopol (1854).

London, tn., Middlesex co., Ontario, Canada, on the river Thames, 116 m. s.w. of Toronto. It is in the centre of a rich agricultural district; has factories, foundries, chemical works, petroleum refineries, and sulphur springs. Pop. (1901) 37,981.

London, Jack (1876), American author, born at San Francisco. After a very adventurous youth and some years spent in travel over many parts of the world, he went as war correspondent to Japan, Korea, and Manchuria (1904). Among his numerous works are The Son of the Wolf (1909), The Children of the Frost (1902), The Call of the Wild (1903), The Sea Wolf (1904), The Game (1904), and The War of the Classes (1905), and The War of the Classes (1905).

London and North-Western Railway. This railway was the first to open a station (Euston) in London. It was incorporated (1815), being an amalgamation of the London and Birmingham, the Liverpool and Manchester, Grand Junction, and the Manchester and Birmingham Rys. The company owns a total mileage of 1,719, the main line extending from Euston, London, to Carlisle in the north, London, to Carriste in the norm, to Leeds in the east, and to Liverpool and Holyhead in the west. The authorized capital of the company is £122,632,484; and for the year ending Dec. 31, 1905, the receipts were £14,756,451, and the expenditure £9,272,436. The dividend on the ordinary stock in dividend on the ordinary stock in 1905 was 61 per cent. The rolling stock comprises 3,035 locomotives, 9,500 coaches run on passenger trains, and 81,060 goods trucks. The company also owns a fleet of seventeen steamers, carrying passengers and cargo between Holyhead and Dublin, Holyhead and Greenore, and on Carlingford Lough.

Löndon and South-Western Rallway Company. Originally established (1834) as the London and Southampton Ry., the name was changed to its present title when an act was obtained to make abranch line to Portsmouth (1839).

The mileage owned and worked over is now 1,009, the main lines extending to Southampton, Portsmouth, Weymouth, Plymouth, Ilfracombe, Bude, and Bodmin. Waterloo Station is the London terminus. The total capital is £45,485,091; and for the year 1905 the receipts were £5,319,150, and the expenditure £3,262,532. The dividend on the ordinary stock for 1905 was 6 per cent. The rolling stock includes 736 loconotives, 4,153 passenger coaches, and 14,238 trucks of various kinds. The company owns a fleet of eighteen steamers, carrying passengers and cargo between Southampton and France and the Channel Islands, and between Lymington and the Islo of Wight. It is also part owner of the steamers plying between Portsmouth and Ryde. The Southampton Docks (including the Empress Dock, 184, ac., and two of the largest graving docks in the world) also belong to this company.

London, Brighton, and South Coast Railway. Originated (1835) as the London and Croydon Ry., the main line from London to Brighton being completed (1841). Until 1845 the atmospheric system was in use between London and Croydon, and the company was amalgamated under its present title (1846). The main lines of the company run to Brighton, Eastbourne, and Portsmouth, but serve all the coast towns between Hastings and Portsmouth, the total mileage owned being 431. The capital created is £27,979,103, exclusive of loan capital; and the receipts for the year ending Dec. 31, 1905, were £3,367,609, and the expenditure £1,939,201. The dividend paid on ordinary stock in 1905 was 5\(^2\) per cent. The rolling stock comprises 535 locomotives, 4,360 passenger coaches, with 9,527 goods wagons. The company also owns a fleet of steamors, carrying cargo between Newhaven and Caen, the fleet running between Newhaven and Dieppe being owned jointly with the Western Railway Co. of France.

London Clay, a formation of Lower Eocene age, is the substratum on which most of London is built. It is a tough, compact clay in which traces of bedding are rarely seen, and, though usually red or brown at the surface, is typically blue-gray at greater depths, owing to the presence of sulphide of iron. The London Clay is very impervious to moisture, and forms a soil which is damp and cold in winter, while in summer it bakes hard and cracks with the drought. It becomes slippery when wet, and houses which have not sufficiently substantial foun-

dations often develop cracks in their walls. Around London and in the lower part of the Thames valley the London Clay covers a large area. Many brick fields have been opened in the London Clay, especially near the edges of its outcrop, where sand can be obtained to mix with it. It rests on the Oldhaven and Thanet beds. As a rule, it contains few fossils, but in some places shells, remains of plants, birds, fishes, and quadrupeds are found. Often there are bands of large calcarcous septaria in the London Clay, which have been used for the manufacture of coment. The London Clay is a marine deposit, apparently laid down near the mouth of a river. See Lyell's Principles of Geology (12th ed. 1875), Whittaker's Geology of London (1889), and Bowerbank's Fossils of the London Clay (1840).

Londonderry. (1.) Maritime co., Ulster, Ireland, with seaboard extending between the Bann and Lough Foyle. In the .E. it is washed by Lough Neagh. The surface is in great part mountainous, the highest point being Mt. Sawell (2,236 ft.), on the southern border. There are many fertile valleys and low-lying tracts, especially near the northern coast and Lough Neagh. The principal rivers are Foyle, Faughan, and Bann, flowing north, and Moyola into Lough Neagh. Agriculture is the chief industry, and linen is manufac-tured. The fisheries are valu-able. The county is divided into six baronies, and returns two members to Parliament. The greater part of the county was made over by James I. to the Common Council of London and the Irish Society was incorporated, and this, with the Mercers' Company, still retains proprietary rights in the county. Area, 816 sq. m. Pop. (1901) 144,400.

(2.) Or Derry, munic, and park, bor, eity, and can, of above co. bor., city, and cap. of above co., 144 m. N.W. of Dublin. It is situated on a hill, partly sur-rounded by the Foyle, about 4 m. above its expansion into the lough. The walls, about 1 m. in circuit, were constructed early in the 17th century. The present cathedral of St. Columb -an embattled edifice, built 1633, and subsequently chlarged—occupies the summit of the hill, and adjacent is the bishop's palace. Shirt-making is the principal in-dustry, and there are distilleries, dustry, and there are distilleries, foundries, tanneries, and a ship-yard. In 1688-9 took place the memorable siege by the forces of James II. Pop. (1901) 39,892. See Dwyer's The Siege of Londonderry in 1689, and Waddington's Guide to Londonderry (1906) (1896).

Londonderry, CHARLES STEWART VANE - TEMPEST - STEWART, MARQUIS OF (1852), English statesman, was born in London, and educated at Eton and Oxford. As Viscount Castlereagh he occupied a seat in the House of Commons (1878-84), when he succeeded to the marquisate. Lord Londonderry was lord-lieutenant of Ireland (1886-9), chairman of the London School Board (1895-7). He became Postmaster-general, and was admitted to the cabinet (1889). Lord Londonderry was

February the title was changed to that by which it has ever since been known. The first editor, or gazetteer, was Joseph Williamson, under-secretary of state; and among others who afterwards held the post was Sir Richard Steele. The position was mich coveted, and was bestowed by the government of the day as a reward for services rendered in political controversy. Down to 1696 a version of the Gazette was published in French as well as English. At the presence of the control of the

and staffs of the United Kingdom were reorganized, constituted London a separate district. The area includes the London County Council district in Middlesex, the depôt of the brigade of Guards at Caterham, and, so far as the household troops are concerned, Windsor. For the purpose of the annual summer training of the household troops, the camps at Pirbright, Surrey, are also included in the London District.

London Pride, or None-so-PRETTY, is a little evergreen plant, Saxifraga umbrosa, one of the commonest plants in town and cottage gardens. From pretty green rosettes of leaves spring numerous tall, quaint, hairy flower-stalks, bearing panicles of little flowers. Each of the five small white petals is dotted with red, and towards the centre of the flower with yellow; whilst the erect white stamens are terminated by anthers, coloured terra-cotta.

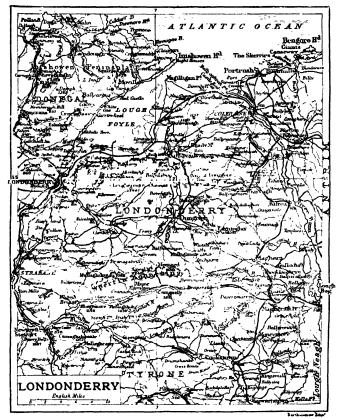
Long, Lock, arm of the sea between Argyllshire and Dumbartonshire, Scotland, 5 m. N.W. of Greenock. Its western extension is known as Loch Goil. At its northern extremity are the village of Arrochar, and Ben Arthur, or the Cabbler 19, 801 ft.)

of Arrochar, and Ben Arthur, or the 'Cobbler' (2,891 ft.).

Long, George (1800-79), English classical scholar, born at Poulton, and educated at Cambridge, where his career was marked with brilliant success. He held professorships at Charlottesville, Virginia (1824-8), and in the newly-founded University of London, now University College (1828-31), and again from 1842 to 1846. He edited several atlases, classical and modern, a Political Dictionary, the series known as the Bibliotheca Classica, and published Two Discourses on Roman Law (1847), and the Decline of the Roman Republic (1864-74); also manuals of Greek and Latin grammar and etymology. See Mathews's In Memoriam (1879).

Long, John Davis (1838), American jurist and statesman, born at Buckfield, Maine. He was a member of the state legislature of Massachusetts (1875-8), of which state he was governor for three years (1880 2). He was thrice elected to Congress, and in 1897 became secretary of the United States navy, which office he administered with great ability during the Spanish-American war.

Long, RIGHT HON. WALTER HUME (1854), English statesman, born near Bath; entered Parliament (1880). He sat for N. Wiltshire until 1895, for Devizes (1885-92), for the W. Derby division of Liverpool (1892-1900), and for S. Bristol (1900-5), but was defeated in 1906. There-



President of the Board of Education in the Balfour administration (1902-5), and on the retirement of the Duke of Devonshire from the government (1903), he also held the office of Lord President of the Council.

London Gazette, THE, official organ of the state, has been published now for nearly two hundred and fifty years. It first appeared in November 1665, under the title of The Oxford Gazette, when the court of Charles II. had been driven to Oxford by the plague; but in the following

ent day the Gazette is wholly occupied with proclamations of state, promotions, appointments, transfers and retirements of naval and military officers, official and legal announcements, and advertisements inserted in compliance with the law or the order of the courts. The Gazette is published twice a week, on Tuesday and Friday. A similar Gazette for Scotland is issued bi-weekly in Edinburgh, and one for Ireland in Dublin.

London Military District. The Army Order of Jan. 6, 1905, by which the military commands upon he was returned for Dublin County, South division. In the second Salisbury administration (1886-92) he was appointed parliamentary secretary to the Local Government Board, and on the formation of the coalition government (1895-1900) he was made President of the Board of Agriculture. When the government was reconstructed (November 1900), Mr. Long was made President of the Local Government Board, a post to which he was again appointed in 1902. In March 1905 he became Chief Secretary for Ireland on the retirement of Mr. George Wyndham, a position he held till Mr. Balfour's resignation in December of that year.

Longan, the name given to an Indian evergreen tree, Nephelium longana, which grows to almost twenty feet in height, and bears in late spring loose panicles of small white flowers. The flowers are followed by yellow globose berries, containing white, tart,

juicy pulp.

Long-boat. The largest boat in a ship, furnished with mast and sails, as well as with pulling gear. In old times the chief use of a long-boat was for cruising short distances after merchant ships of the enemy, and for this purpose it was armed. It was also employed for excursions against smugglers, for impressing seamen in the days of the pressgang, and for taking the heavier stores and provisions on board.

Long Branch, fashionable seaside resort, Monmouth co., New Jersey, U.S.A., 45 m. s. of New York, and within easy reach of it by steamer. Pop. (1900) 8.872.

it by steamer. Pop. (1900) 8,872. Longchamp, pleasure resort in the Bois de Boulogne, w. of Paris. Its abbey, founded in 1260, was, until its suppression in 1792, a centre of musical attraction during Holy Week. The race for the Grand Prix is run over Long-

champ course.

Longchamp, WILLIAM DE (d. 1197), a Norman of low birth, who won the confidence and favour of Richard I., under whom he rose to be bishop of Ely and chancellor. He was a strong opponent of the faction led by John, and throughout a loyal defender of Richard's interests in England, particularly in the matter of raising the king's ransom. His exactions rendered him generally unpopular, in spite of his great talents for government, organization, and diplomacy. See Gesta Ricardi Regis, and Boivin-Champeaux's Notice sur Guillaume de Longchamp (1885).

Longevity. In considering length of life from the biological standpoint, it is convenient to divide organisms into two cat gories—those with one reproductive period, and those which

reproduce more than once. In the former the whole life history may be run through very rapidly, as in many of our garden annuals among plants; or the life may be divided into a prolonged vegetative period and a brief reproductive period. Thus the so-called biennials among plants accumulate food-stores during their first season, and use these up during the second or reproductive season. If the strain of reproduction be very heavy, then the vegetative period may be greatly prolonged, as in the familiar case of the Yucca. Quite similar conditions occur among insects, where the whole life history may be short, or, as in the May-flies or Ephemerides, larval life may be prolonged though the adult reproductive life is very short. In all such cases death ensues as soon as the needs of the new generation are provided for. Where there is periodical reproduction the matter is much more complicated. In the case of perennial plants, if the food-supply continue sufficient, there seems no reason why life should not be prolonged, unless through accident, almost in-definitely. The same is apparently true of many sluggish and sedentary animals. With most active and highly differentiated animals, however, the length of life is more or less definitely determined for the species, though the reason for the limit is not quite understood. It has probably something to do with size, for, generally speaking, small animals are shorter lived than large ones; but this is only approximately true, for queen ants are long-lived. Again, the length of life has something to do with the rate at which maturity is reached: man and the elephant alike come slowly to maturity, and are long-lived. On the whole, however, no general statements can be laid down as to what determines the length of life, and the problem is greatly complicated by the fact that most of the available figures refer to animals under the artificial conditions of domestication or captivity. We have at present no means of knowing how frequently natural death occurs among wild animals.

Longfellow, Henry Wadsworm (1807-82), the greatest of American poets, was born at Portland, Maine, on Feb. 27, 1807. He was the son of Stephen Longfellow, a Portland lawyer, and Zilpah, daughter of General Peleg Wadsworth, a descendant of John Alden and Priscilla, the Puritan maiden' whose fame the poet has preserved in The Courtship of Miles Standish. In 1825 he entered his father's office:

but disliking the study of law, he accepted the newly-founded chair of modern languages at Bowdoin College, Brunswick, his alma mater, with leave of absence for travel. He sailed for Europe in 1826, and during the next three years made a study of European languages, visiting France, Spain, Italy, and Ger-many. He entered upon his duties at Bowdoin in the autumn of 1829, and proved eminently successful as a teacher. Longfellow published a translation of Las Coplas of Don Jorge Manrique (1833), which is said by Professor Torricelli to excel the original in power and literary ease. In the same year he issued a portion of Outre Mer, a fruit of his European travel, the second part of which appeared in 1835. A year later he succeeded George Ticknor, the Spanish historian, as professor of modern languages at Harvard; but before entering upon his duties he paid another visit to Europe, particularly to the Scandinavian countries and Switzerland. His wife, Mary Storer Potter, whom he had married in 1831, died at Rotterdam in November 1835, and is commemorated in his poem The Footsteps of Angels. Hyperion (1839), a poetical romance which enjoyed immense popularity, reflects the combined influence of Richter and German romanticism on the poet. The heroine of the story, Frances Elizabeth Appleton, became his wife in 1843. Longfellow's career at Harvard began in 1836, and continued for seventeen years, during which time he faithfully discharged his duties, although these were often uncongenial. At his house in Cambridge, previously the residence of General Washington, he gathered around him a large circle of friends, including Agassiz, Hawthorne, Holmes, Lowell, Emerson, Felton, and Sumner. Voices of the Night (1839) and Ballads (1841) awakened the world to the fact that a new poetical force had arisen in literature. These volumes included such familiar pieces as The Psalm of Life, Footsteps of Angels, The Skeleton in Armour, The Wreck of the 'Hesperus,' The Village Blacksmith, Excelsior, and The Be-leaguered City, all of them unequalled for simplicity of diction, tenderness, and pathes. Two years later a play, without any special merit, The Spanish Stu-dent, enjoyed an almost equal popularity. Longfellow paid a third visit to Europe in 1842, and on his return home he published his Poems on Slavery, a volume including The Quadroon Girl, The Slave Singing at Midnight, and The Warning, which went far towards awakening the Amer-

ican people to a sense of the injustice of negro slavery. The Pocts of Europe (prepared in conjunction with Professor Felton), The Belfry of Bruges, The Waif, and The Estray, written between 1845 and 1846, widened the poet's fame. These were followed by Evangeline (1847), the greatest and best of his longer poems, written in dactylic hexameters, the sentiment of the poem being exqui-sitely adapted to its measure. steely anapted to its measure. Kavanagh (1849) proved a failure; but The Seaside and the Fireside (1850), a volume of minor poems written in a most engaging form, was more successful; and equally so was The Golden Legend (1851)—a romance of the middle ages, based on Hartmann von Aue's Der Arme Heinrich—ranking next to Evanycline, and containing many passages of rare beauty. Longfellow resigned his chair at Harvard (1854) in order to devote himself more freely to purely literary work. Hiawatha (1853), a legend of the North-East Indians, the outcome of his new and welcome laisure was maintain in leisure, was written in the tro-chaic tetrameter measure of the Finnish epic Kalevala. The metre, which readily lends itself to ridicule, and is by some considered monotonous, suits the subject, and proves fascinating to most ears. It ran through thirty editions in one year. The Courtship of Miles Standish (1858), a romance in hexameters founded on the early history of the Plymouth colony, tells in grim and realistic tones of the hardships and strug-gles of the 'Pilgrim fathers;' but gles of the Prigrim lattices; one the beautiful story of the noble and womanly love of Priscilla makes us forget all blemishes in the poem. A collection of minor poems, Birds of Passage, appeared simultaneously with Miles Standish. In 1861 Longfellow's wife was burned to death in his presence, and from this shock the poet never recovered, although in time he resumed his writing. His charming Tales of a Wayside Inn appeared in 1863; a second series of the Tales was published in 1872, and a third in 1873. Flower de Luce and Other Poems rower at Lice and Other Poems appeared in 1867, New England Tragedies in 1868, and The Divine Tragedy in 1871, the last a poetical rendering of Leiden's history of Christ. The two last-named works, together with The Golden Legend, appeared in 1873 in one volume, under the title of Christus, a Mystery. Longfellow's later tus, a Mystery. Longtellow's later poems, which show few signs of his advancing years, include Aftermath (1874), The Masque of Pandora (1875), Keramos (1878), Poems of Places (in 31 vols. 1875-78), Sonnets (including Three Frienc's of Mine), a translation of Dante's Divina Commedia (1871), Ultima Thule (1880), and Hermes

Trismegistus (1882).

It is difficult to estimate Longfellow's real place among the poets of the world. In imagination and intensity of feeling he is not to be compared with poets of the first rank, yet his poetical powers were of a high order, and his sense of proportion and of melody was exquisite. Moreover, he was a man of great mental

Longford. (I.) Inland co., Leinster, Ireland. It has extensive tracts of bog; on the Leitrim border are bare hills, and in the centre and S. good grazing land. The Shannon, on w. border, expands S.w. into Lough Ree; other rivers are Inny and Camlin. Pasturing and agriculture are principal industries. The county returns two members to Parliament. Area, 421 sq. m. Pop. (1901)



Henry Wadsworth Longfellow.

and moral refinement, of high ideals and broad humanity, perhaps the most essential qualities in modern poetry. See Life by his brother, the Rev. Samuel Longfellow (1886); Final Memorials of H. W. Longfellow (1887), by the same author: Higginson's Old Cambridge (1889), and a Life of Longfellow in American Men of Letters (1902); and Carpenter's Longfellow, in the Beacon Biographies (1901).

46,672. (2.) Town, cap. of above co., 9 m. w. by N. of Edgeworthstown. It is an agricultural centre, and has military barracks. The seat of the Roman Catholic bishop of Ardagh and Clonmacnoise, its cathedral is a fine structure of the Ionic order. There is also a Roman Catholic college. Pop. (1901) 3,747.

Longinus, DIONYSIUS CASSIUS (c. 213-c. 273 A.D.), a famous Greek rhetorician, whose place of

birth was most likely Athens. Late in life he went to Emesa in Syria, where he met Zenobia, queen of Palmyra, who induced him to become her teacher of Greek literature. After the death of her husband he was her chief adviser, and counselled her to throw off her allegiance to Rome, the result of which was that (273 A.D.) the Emperor Aurelian captured and destroyed Palmyra and executed Longinus. A number of critical, rhetorical, and philosophical works of his are mentioned, but they are all lost. The great work De Sublimitate—the finest example of ancient literary criticism—attributed to

which are united to form the city of New York. It was incorporated with New York on Jan. 1, 1898. Pop. (1900) 48,272. (3.)
L. I. SOUND, separating Long I. from the coast of Connecticut. Length, over 100 m.; width, from 2 m. to 25 m.

Longitude. See LATITUDE AND LONGITUDE.

Longmans, a London firm of publishers, founded by Thomas Longman, a native of Bristol. Apprenticed when seventeen to John Osborne, a London publisher, he became his partner (1724), and at his death (1734) succeeded to the business. He was the first of five Thomas

Longman's Magazine, a monthly journal of general literature established in 1882, was discontinued with the number for October 1905.

Longnon, Auguste Honoré (1844), French scholar and historian, born in Paris; has been successively titular archivist in the imperial archives (1871), director of the Rulletin of the Historical

rian, born in Paris; has been successively titular archivist in the imperial archives (1871), director of the Bulletin of the Historical Society of Paris and Ile de France (1875), professor at the Ecole des Hautes Etudes (1879) and the Collège de France (1892). His most important works are (Hoggraphie de la Gaule au sizième Siècle (1878), Atlas Historique de la France, depuis César jusqu'à nos Jours (1884 - 9), and Paris pendant la Domination Anglaise,

1420 1436 (1878).

Long Parliament, the name commonly given to the fifth and last parliament of Charles I. It met on Nov. 3, 1640, and finally dissolved itself (March 16, 1660). The first few months of the Long Parliament were occupied with the trial of Strafford, the impeachment of Laud, the abolition of the Star Chamber and other special courts, and a bill preventing the king from dis-solving Parliament without its own consent. On constitutional matters the members were unanimous, but on ecclesiastical questions a dispute arose which eventually led to the civil war. In 1647, while negotiations were being conducted with the king, a conflict broke out between the Parliament and the army, which ended in the expulsion by the latter ('Pride's Purge') of ninetysix Presbyterian members, and the arrest of forty-six, leaving about fifty members, afterwards known as the 'Rump.' This rem-nant was responsible for the execution of the king and the establishment of the commonwealth. In 1654 it was turned out by ('romwell, and did not reassemble till nearly six years later (May 8, It was again expelled (Oct. 13), but was restored (Dec. 26) in consequence of divisions in the army. On the entrance of Monck into London (Feb. 3, 1660) it agreed to dissolve, and issued

writs for a general election.

Longridge, vil. near Longridge Fell, Lancashire, England, 7 m. N.E. of Preston; has cotton-spinning and weaving, brassfounding, and valuable stone quarries. Pop. (1901) 4,304.

Long Service Medal, MILITARY, a decoration awarded to a non-commissioned officer or private of the regular army who has served for eighteen years with an unblemished character. It carries with it a gratuity of five pounds, payable on discharge.

Longships Lighthouse. See LAND'S END.



Bartholomew Edin"

him, is probably of earlier date. See edition by Rhys Roberts (1899); Saintsbury's *History of Criticism* (1900-4).

Long Island. (1.) Large isl. forming part of New York state, U.S.A. It lies off the coast of that state and Connecticut, separated from them by Long Island Sound. Brooklyn and Queen's boroughs of New York city are situated at its western end. Its area is 1,680 sq. m. Pop. (1900) 1,452,611. (2.) L. I. CITY, formerly a city of Queen's co., New York, U.S.A., 5 m. N.E. of Brooklyn, at w. end of Long I. It is now; included in the borough of Queen's, New York city, and is one of the five boroughs

Longmans who have successively extended the firm. The Longmans have been associated as publishers with many famous names in English literature, among them Wordsworth, Southey, Coleridge, Moore (who had £3,000 for Lulla Rookh), Scott, Sydney Smith, Macaulay (who received £20,000 for 2 vols. of his History of England), Mill, Disraeli (to whom they paid £10,000 for Endymion), Froude, Max Müller, Jean Ingelow, Lord Avebury, and Andrew Lang. Lindley Murray's Gramar, published by the second Thomas Longman, reached its 70th edition in 1896. The Edinburgh Review (purchased 1826) is still the property of the firm.

Longstreet, JAMES (1821-1904), American general, born at Edge-field, S. Carolina; distinguished himself in the Mexican war, and with the Confederate army in the civil war. He took an important part in the battles of Bull Run and Fredericksburg, held a com-mand under Lee at Gettysburg, and was mainly responsible for the victory of Chickamauga, where he was severely wounded. After the war he held various civil posts, and served as minister to Turkey (1880-81). He published From Manassas to Appomattox (1896).

Longton, munic. bor. in the Potteries dist., Staffordshire, England, 21 m. E.S.E. of Stoke. China and earthenware are the stable industries. There are staple industries. There are valuable coal and iron mines in the vicinity, also blast furnaces. Pop. (1901), 35,815.

Longwy, tn., dep. Meurthe-et-Moselle, France, near Belgian

L. sempervirens, with whorls of scarlet and yellow flowers; L. tarturica, with pinkish flowers; L. caprifolium, with blue and yellow flowers; and L. fragrantissing with which in the seminary of the seminary tissima, with white, richly-scented flowers

Lonigo (anc. Leonicum), tn., prov. Vicenza, Venetia, Italy, on river Gua, 23 m. w. of Padua; has mineral springs. Pop. (1901)

Lonneker, vil., prov. Overijssel, Netherlands, 3 m. N. of Enschede; has cotton and thread mills. Pop. (1899) 10,951.

Lönnrot, Elias (1802-84), Finnish scholar, born at Sammatti. Nyland. He collected and edited the folk-songs of his people— Kantele (1829-31), their great epic of Kalevala (1835), their lyrical poetry (Kanteletar, 1840), and collections of proverbs (Sanalaskuja, 1842) and riddles (Arwoituksia, 1844; new ed. 1861). He also issued an extensive Finnish-Swedish

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Long Island, New York.

frontier, 18 m. s.w. of Luxemburg, is divided into a lower and upper

is divided into a lower and upper town, the latter of which is strongly fortified. It has mines of iron ore. Pop. (1901) 9,235.

Long Xuyen, or Long Chuyan, the Bassac, 30 m. S.E. of Chandoc. Long Xuyen communicates with the Gulf of Siam by the gangle of Beakers. Pen by the canal of Rachgia. Po (arrondissement) about 95,000.

Lonicera, a genus of hardy and half-hardy shrubs belonging to the order Caprifoliacen; char acterized by flowers with a small, five-toothed calyx, a five-lobed tubular corolla usually with an irregular limb, five stamens, and a knobbed stigma. The only true British native species is L. periclymenum, the common woodbine or honeysuckle of our hedges; but many species are cultivated in our gardens and greenhouses. Some of the most beautiful are the half-hardy evergreen twiner, dictionary (1866-80). See Life by Ahlqvist (1885), and FINLAND—Language and Literature.

Lons-le-Saunier, tn., cap. of dep. Jura, France, near source of riv. Solman, 35 m. s.e. of Chalon-sur-Saône. Near it is Montmorot, famous for its brine springs. The town was the birthplace of General Lecourbe and of Rouget de Lisle, author of the Marscillaise. Trade in salt, wine, and agricultural produce. Pop. (1901) 12,935.

Loo, a card game. See GAM-BLING.

Loo-choo or Lu-chu Islands (Jap. Riu-kiu) contain thirty-six principal islands, extending in a north-east to south-west direction from the Gulf of Kagoshima, in S. Japan, to Formosa, between lat. 24° and 30° N., and long. 125° and 130° E. Of these the northern islands have long since fallen under Japanese rule. Loo-choo Proper lies between 26° and 27° N. lat., and consists of nine islands, of

which the chief is Great Loo-choo or Okinawa, 56 m. long, and from 2 to 14 m. broad. In this is situated the old capital, Shuri, a few miles inland from the port, Nafa or Naba. Unten (Port Melville) is a good harbour on the northwest coast. The islands are mostly volcanic, but in the south are some of coralline formation, and one (Tri-omote-jima), in the Further Isles,' is of limestone, and possesses rich coal mines. In Yakuthe mountains are no-shima over 6,000 ft. high, but elsewhere they seldom exceed 2,000 ft.

At the close of the 14th century the king of Loo-choo recognized Chinese suzerainty, but homage was also paid to Japan. In 1874 China was compelled by Japan to abandon her claims, and in 1876 the islands were incorpcrated in Japan, and the king was carried to Tokyo, where he died (1901). The principal products are sugar-cane, sweet potatoes, rice, Indian corn, tobacco, indigo, and various cereals; and the exports include sugar, silk, cotton and hempen fabrics, lacquer, and The written lanearthenware. guage, manners, wedding and burial customs, are distinct from these of Japan and China. Pop. (1898) 453,550. See Basil Hall's Voyage of Discovery to the West Coast of Corea and the Great Loochoo Islands (1818); Basil Hall Chamberlain's The Loo-chco Islands and their Inhabitants,' in Geog. Jour. (1895).

Loofah, a name given to the fibrous part of the fruit of the towel-gourd, Luffa agyptiaca order Cucurbitaces. It is often used as a bath sponge in this country. The similar part of the country. The similar part of the fruit of L. acutangula is so used in the W. Indies, and also in the manufacture of baskets.

Lookout Mountain, See CHATTANOOGA.

Loom. See Cotton-Manufacture, and Woollen Textiles.

Looming, the name applied by nautical men when distant objects appear abnormally elevated above their true positions. The illusory appearances are due to successive bending of the rays of light in their passage through atmostheir passage through atmospheric strata. The phenomenon is of the nature of the mirage. See MIRAGE.

Loomis, Elias (1811-89), American astronomer and mathemaican astronomer and mathematician, studied at Yale. After holding professorships at Hudson, Ohio (1837-44), and in the University of New York (1844-60), he returned to Yale as professor of natural philosophy and astronomy (1860-89). He was the author of numerous works on natural philosophy, astronomy, and other scientific subjects, all marked by accuracy and precimarked by accuracy and precision. Loomis was also the author

of a genealogical work, The De-

scendants of Joseph Loomis.

Loon, or Loom, a popular term sometimes applied to the great northern diver on account of its clumsiness on land, but also used in Norfolk for the great crested grebe.

Loón, largest tn., isl. of Bohol, Philippines, on W. coast, 15 m. N.w. of Tagbilaram, has a good anchorage about 3 m. distant.

Pop. 15,000. Loosestrife. See Lysimachia

and LYTHRUM.

Lope, FELIX DE VEGA CARPIO (1562-1635), Spanish dramatist, born in Madrid, and educated at the Jesuit College there. As a soldier, he fought at the Azores (1582) and in the Armada (1588), serving in several official posts, but all the while writing facile, witty verse. His first known play, El Verdadero Amante, was written when he was twelve years old. During the dreadful voyage with the Armada he wrote most of his Hermosura de Angelica (11,100 verses), an epic in imitation of the Orlando Furioso. Then followed a pastoral prose narrative, Ar-cudia, of which fifteen editions appeared in the author's lifetime. In 1598 appeared the famous epic poem on Sir Francis Drake, Dragontea, a savage attack on the great scaman who had beaten the naval power of Spain. His sacred poem, San Isidro, followed (1599)—one of his best works. Rhymes and sonnets by the hundred were issued during the next two years, and Lope was then acknowledged the first poet in Spain. He now devoted himself for some time to sacred poems, such as Soliloquios and Los Pastores de Belen (1612). He then became a priest and a 'familiar' of the Inquisition, but never slac'tened in his marvellous fecundity in every branch of letters. In drama alone he wrote 1,800 separate plays and 400 autos (religious pieces), of which 400 plays and 40 autos survive. A large number of the dramas are to be found in the series Autores Espanoles by Hartzenbusch (1846-80). A complete edition of his Obras is in course of publication by the Spanish Academy. See Ticknor's History of Spanish Literature, vol. ii. (1849), Von Schack's Geschichte der Dramatischen Literatur und Kunst in Spanien (1845-46), Lord Holland's Life (1806), and Rennert's Life (1904).

Lope de Rueda. See RUEDA. Lopes, SIR MANASSEH MASSEH (1755-1831), English politician. born in Jamaica, a descendant of a family of Spanish Jews. Lopes settled in England, abandoned Judaism, entered Parliament as member for New Romney (1802), and was made a baronet (1805). In 1819 his election for Barnstaple

was petitioned against on the ground of bribery. He was un-seated, and the same year was fined £1,000 and sentenced to two years' imprisonment for bribery at a previous election at Grampound. On his release he was returned for his pocket borough of Westbury (1823), but resigned (1826) to provide a scat for Peel, who had been defeated at Oxford.

Lopez, FRANCISCO SOLANO (1827-70), tyrant of Paraguay, was the son of Carlos Antonio Lopez, president of Paraguay. On his father's death he was appointed president, and immediately began to develop the unscrupulous and ultimately suicidal policy of aggression for which he will be long remembered. Lopez was virtually dictator, and in 1865 declared war against Brazil and the Argentine Republic. Uruguay, the Argentine, and Brazil allied themselves against him, and the war was only closed by the death of Lopez (1870). See Washburn's History of Paraguay (1870).

See BONY Lophobranchii. FISHES.

Loquat, the Japanese medlar or quince, is the fruit of a small tree (Photinia japonica) which can be grown in the open air in sheltered parts of Britain. As it flowers in autumn, however, it requires glass protection in order to produce and ripen its fruit. The flowers are white, and are borne in drooping racemes, the edible, ovoid, orange-red fruit appearing in bunches.

Lorain, city of Lorain co., Ohio, U.S.A., 30 m. w. of Cleve-land, on Lake Erie. It has a good harbour and a considerable trade in coal. Pop. (1900) 16,028.

Loranthaceæ, an order of parasitic evergreen shrubs, bearing usually small, inconspicuous, whitish flowers, followed by fruits containing a viscid substance often used as birdlime. The mistletoe (Viscum album) is the best-known species in Britain.

Lorca, city, prov. Murcia, S.E. Spain, 41 m. from Murcia. It was the scene of much strife between Moors and Christians in the 12th and 13th centuries. Wine is produced, and there are some lead mines in the neighbourhood.

Pop. (1900) 69,836.

Lord. There are many uses of the word 'lord' in English in the sense of a master, or person possessing or entitled to author-This appears from such widely different expressions as 'the Lord God,' 'our Lord Jesus Christ,' 'the lord of the manor,' 'her lord and master,' and the common word 'landlord.' But it is only necessary to consider here two uses of the word—first, as meaning a nobleman; and secondly, as an honorary title of certain official persons, used

either in addressing them or as part of their designation. In the first sense all peers are lords tem-poral, and all archbishops and bishops (of the Established Church at any rate) are lords spiritual. It is often erroneously said that the lords spiritual and temporal are the archbishops, bishops, and peers who have seats in the House of Lords; but this mistake arises from the fact that Acts of Parliament are expressed as being made by and with the advice and consent of the lords spiritual and temporal and commons in this present Parliament assembled.' There are lords as well as commons who are not in Parliament. By courtesy the eldest sons of peers above the rank of viscount assume a title, which is usually the second or some other title of their father. They do not always assume the same title. Thus the Marquis of Lansdowne's eldest son is in alternate generations called Earl of Kerry and Earl of Shelburne. Moreover, in some cases they assume a courtesy title which the father has not got. Thus the Earl of Belmore's eldest son is Viscount Corry, and the Barl of Lucan's is Lord Bing-ham. The eldest grandsen of a duke by his eldest son in some cases takes by courtesy a title of his grandfather. The younger sons of dukes and marquises ascume by courtesy the title of 'Lord' before their Christian names, as Lord Archibald Campbell and Lord Charles Beresford.

Many holders of high office are called lord as part of their official title, as, for example, the Lords of the Privy Council, of the Treasury, and of the Admiralty, the Lord Chancellor, the Lord Privy Scal, the Lord Chamber-lain, the Lord High Steward, and the Lord Advocate: the Lord-Lieutenant of Ireland, and the Lord-Lieutenants of counties, the Lord Chief-Justice, the Lord Justices of Appeal, and the judges of the Court of Session. The judges of the High Court in England are addressed 'My Lord,' but their title is 'Mr. Justice.' The mayors of London, Mandard Court of the court o chester, Liverpool, Birmingham, York, Cardiff, and Dublin are Lord Mayors; and the provosts of Edinburgh, Glargow, Aberdeen, Dundee, and Perth are Lord Provests.

Lord High Steward, the first of the great officers of state in England. Formerly he sat judicially in the Court of Claims to determine all claims to render service to the king or queen at a coronation. The duty is now usually discharged by a special committee of the Privy Council.

Lord Howe Islands, group of islands, S. Pacific, between Port Jackson and Norfolk I., 550 m.

E. of Sydney, in 311° S. lat. and 159° E. long. They belong administratively to New South Wales. The islands were discovered in 1788, and occupied in 1834. Vegetation is abundant, particularly banyan trees. Area, 5 sq. m. Pop. 100.

Lord-Lieutenant of Ireland, the head of the executive in Ireland. As representing the King he holds courts, drawing-rooms, and other functions of a semiregal nature. See IRELAND.

Lord-Lieutenants of counties were originally appointed in the reign of Henry VIII. to control the military forces of the crown. They also exercised many of the duties formerly performed by the sheriffs. In 1662 they were given entire control of the militia, but by the Militia Act, 1882, their functions were transferred to the crown. They must appoint twenty duly qualified deputylieutenants in each county approved by the crown, three of whom may act for the lord-lieutenant during absence. The lordlieutenant may also appoint a vice-lieutenant, and he generally recommends county justices to the lord chancellor for appointment.

Lord Mayor's Day. MAYOR.

Lord Nelson, a British first-class battleship of 16,500 tons, launched at Tyneside in 1906; one of the three most powerful warships ever designed, the others being her sister ship Agamemnon and the Dreadnought.

Lord of the Isles. See ISLES, LORD OF THE.

Lords, House of. See PARLIAMENT.

Lords-and-Ladies. See ARUM.

Lord's Day. See SABBATH. Lord's Supper. See Eu-CHARIST.

Loreburn, BARON. See REID, SIR ROBERT.

Lorelei, or Lurlei, a famous rock on the right bank of the Rhine, near St. Goar, noted for the danger it offered to navigation and for a marvellous echo. From this originated the legend of the siren, a favourite theme of German poets. Heine has a wellknown poem on the subject, but the earliest version is to be found in Brentano's ballad Zu Bacharach am Rheine wohnt eine Zauberin, written in 1800. The rock is now pierced by a railway tunnel.

Lorenz, ADOLF (1854), Austrian surgeon, was born in Silesia. After a distinguished career as a student at Vienna University, he graduated in 1880, and subsequently became professor of surgery there. In 1895 Professor Lorenz published a treatise on Dislocation of the Hip, and his method of treating congenital dislocation has acquired unenviable prominence through the indiscreet eulogy of the American press. The operation with which his name is associated consists -(1) in forcible rupture of such parts as resist reduction under an anasthetic; and (2) in fixing and retaining the limb in proper position in a plaster case for several months. The term 'bloodless' has been applied to this method, since, the skin being unbroken, there is no external hæmorrhage. But the amount of blood shed into the tissues may be limited only by their capacity, and the damage done to delicate structures, nerves, muscles, and blood-vessels is often severe.

Lorenzo Marques. LOURENÇO MARQUES.

Loreto. (1.) City, prov. Ancona, the Marches, Italy, 14 m. s.e. of Ancona, and about 3 m. from the Adriatic. It owes its origin to a famous chapel of the Virgin, Santa Casa, over which a mag-nificent church was erected. The shrine is still a famous place of pilgrimage. Pop. (1900) 5,000. (2.) Interior dep., N.E. Peru, S. America, bounded on the N. by Ecuador, and E. by Brazil and Political Interior Science of the Political Interior Science of Political Interior Interio Bolivia. It is traversed from N. to s. by the Ucayali and Huallaga, affluents of the Maranon. The department is thickly wooded. The principal exports are rubber and salt. Gold is abundant. Area, 288,456 sq. m. Pop. estimated at 100,000. Its capital is Moyo-100,000. Its capital is Moyobamba. Pop. (1895) 10,000.

Lorica, or SANTA CRUZ DE PALISTRE

LORICA, tn. and scapt., Bolivar, Colombia, S. America, on the Sinu; has active shipping trade. Pop. 7,000.

Lorient, seapt. and fortified naval arsenal, dep. Morbihan, France, on the s. coast of Brittany, at the mouth of Scorff and Blavet Rs., 63 m. N.W. of St. Nazaire, and with an extensive and well-protected harbour. There is a floating dock for vessels up to 600 tons burden and drawing 15 ft. of water. There are two graving-docks. The dockyard is used for the construction and equipment of men-of-war, and is one of the finest in France. The imports are mainly shipbuilding materials, iron, and coal; the exports are wheat, wines, sar-dines. The town was founded in 1670 by the French East India Company, and on the dissolution of the company in 1770 it became a naval station. Pop. (1901) 44,640. Off the port in June 1795 the British under Lord Bridport defeated the French under Villa-ret-Joyeuse. This victory opened the way for an expedition to Quiberon. Although the action was really fought off Groix, it is commonly known as the action off Lorient; and Groix itself was for a time confused by the naval authorities with Belleisle. another island, the result being that the Formidable, which was captured, was renamed Belleisle in honour of the occasion.

Lorimer, JAMES (1818-90), Scottish jurist and author, born at Aberdalgie, Perthshire, was educated at the Universities of Edinburgh, Berlin, and Bonn. In 1865 he became professor of public and international law in Edinburgh (1865), and was one of the founders of the Institute of In-ternational Law (1873). His work, Institutes of the Law of Nations, was published in 1883-4. See notice by Professor Flint in The

Juridical Review (April 1890). Lorimer, John Henry (1856), Lorimer, JOHN HENRY (1856), Scottish painter, born at Edinburgh. He began to exhibit in Edinburgh (1875), and two years later in London. He was elected R.S.A. in 1900. At the Paris Salon he has gained several medals. Among his pictures are The Ordination of Edders (now in the Luxembourg). The Florageth House Luxembourg), The Eleventh Hour (in the Art Gallery, Philadel-phia), Lullabye, A Child's Thankoffering, and A Portrait of Colonel Anstruther - Thomson (Luxem-

Loriquets are parrots nearly allied to the lories, but differing from them in their smaller size and their elongated and pointed tail feathers. One of the largest is Swainson's loriquet (Tricho-glossus Novæ-hollandiæ), which inhabits E. Australia. See LORY.



Loris, or Slow Lemur.

Loris (probably from Dutch loeris, 'a clown'), or SLOW LEMUR, names applied to three Asiatic lemurs remarkable for the exceeding slowness of their movements. The common loris (Nycticebus tardigradus) occurs in the Malay region, and is about the size of a cat, with a broad head, a thick, woolly coat, a very short tail, and large eyes; the thumb and great toe are widely separated from the other digits. The animals are purely nocturnal in habit. A smaller form is the Javan loris (N. javanicus). In the related slender loris (Loris gracilis) of S. India and Cevlon the eves

are exceptionally large, and as the name indicates, the body is more lightly built and the limbs longer. The diet does not differ from that of other lemurs.

Loris-Melikoff, Mikhail Ta-RIELOVITCH (1825-88), Russian statesman and general, born at He was made a count for Tiflis. He was made a count for his brilliant exploits during the Russo-Turkish war (1877-8). Later he so distinguished himself as governor-general of Kharkov (1879) that he was recalled to St. Petersburg to cope with the Nihilist movement (1880). Alexander II.. approving of his conciliatory policy, made him minister of the interior. On the Czar's assassination (1881) he resigned.

Loriti, HEINRICH. See GLARE-

ANUS.

Lörrach, comm., grand-duchy of Baden, Germany, in valley of Wiese, 4½ m. N.E. of Basel. Manufactures cotton, silk, chocolate, and hardware; trades in wine, fruit, and timber. Pop. (1900) 10,347.

Lorraine, or Lotharingia, was a province of France situated on its north-eastern frontier, and included such important towns as Metz and Thionville: It was included in Charles the Great's empire, and on the dissolution of that empire passed through a series of vicissitudes, being subsequently created into a German duchy. From Lorraine came the family of the Guises, and its duke played a prominent anti-French part in the Thirty Years' war 1618-48). During the war of the Polish Succession (1733-5) Lorraine was conquered by French troops, and by the third treaty of Vienna (1738) Lorraine and Bar were given to Stanislaus Leszczynski, the ex-king of Poland, and father-in-law of Louis xv.. for his life, to become eventually parts of France. Francis, the Duke of Lorraine, was compensated with Tuscany, shortly afterwards married Maria Theresa, became emperor in 1745, and was the founder of the new Lorraine-Hapsburg line. In 1871, at the close of the Franco-German war, the greater part of Lorraine, including Metz and Thionville, was annexed to Germany. See AL-SACE-LORRAINE. See also Hassall's Periods of European History (1901), and Lavisse et Rambaud's Histoire Générale (1892).

Lorraine, CLAUDE.

CLAUDE LORRAINE.

Lorris, Guillaume DE (c. 1215-1240), French troubadour, was the author of the first part of the celebrated Roman de la Rose. The bulk and latter part of the poem, which is very inferior to the work of Lorris, was from the pen of Jean de Meung.

Lory, a name given to certain members of the parrot family

Loriidæ, which is confined to the Australasian region. The purplecapped lory (Lorius domicella) of Ceram and Amboyna is an example. Like its allies, it is a honey-sucker, and has the tongue furnished with a kind of brush. It is about a foot in length, and is gorgeously coloured. The ground colour is scarlet, with a gold throat band; the wings are blue and green, and the head capped with purplish black. It is easily domesticated. See PARROT.

Los Andes, or SANTA ROSA DE LOS ANDES, state of Venezuela, on the northern flank of the cor-dillera of Merida. The valleys are fortile, and produce cocoa, coffee, sugar, and, on the higher slopes, wheat and other cereals. Forests extend up to 10,000 ft., above which are the bleak paramos, where only grasses grow. Hot springs are numerous. Area, 14,719 sq. m. Pop. 336,200.

Los Angeles. (1.) City, California, U.S.A., on Los Angeles R., the co. seat of Los Angeles co., and the second city of the state in population. With a level site and a regular plan, it is a beautiful city, having broad, well-paved streets, and detached houses in ample grounds, covered with semi-tropical vegetation. The surrounding country is devoted to the cultivation of fruits, for which irrigation is necessary. The handling of this fruit is the principal item in the large trade of the city. Pop. (1900) 102,479. (2.) Capital, province Bio-Bio, Central Chile, between Laja and Bio-Bio Rs. Pop. (1896)

Los Islands, group of volcanic islands (Factory, Tamara, Ruma), w. coast of Africa, 75 m. N.W. of Freetown. They were occupied by the British in 1826, and ceded

to France by the Anglo-French Agreement, 1904. Pop. 1,422. Losoncz, tn., Hungary, co. Nograd, 111 m. from Budapest; manufactures cloth, glass, and paper. Pop. (1900) 8,952.

Lossiemouth, tn., Elginshire, Scotland, on riv. Lossie, 5 m. N.E. of Elgin. Pop. (1901) 3,904.

Lossing, Benson John (1813-91), American author, born at Beekman, N.Y., was successively farm-boy, watchmaker, journalist, wood-engraver, artist, and historian. His chief works, illustrated by himself, were Pictorial Field-book of the Revolution (1850– 52), and Pictorial History of the Civil War (1866-9); also History of New York City (1884), and The Empire State (1887). He likewise wrote biographies of celebrated Americans, and an Outline History of the Fine Arts (1840).

Lost Property. Lost property still belongs to the true owner, who may retake possession of it either in the hands of the finder or of some one else to whom it has been sold by the finder. finder of lost property is entitled to keep it till claimed by the owner; but if he knows who the owner is, or has reasonable grounds for believing that the owner can be found, then if he converts it to his own use, he is guilty of theft. In the common case of finding lost property in the streets, the finder will commit theft if he does not hand the property over to the police. If the police fail to find the owner, they must return the property to the finder, who is entitled as against all but the true owner. At the principal railway stations there are lost property offices, to which anything found in a railway train is taken. The loser on proving ownership, and paying a small charge, can recover the property. Railway companies have periodical sales by auction of unclaimed goods. See TREASURE TROVE.

Lost Tribes, THE. It is a well-authenticated fact that a considerable proportion of the inhabitants of N. Palestine were carried into captivity during the closing years of the kingdom of Israel. A deportation took place in the reign of Pekah (2 Kings 15:29), and the monuments inform us that no fewer than 27,290 persons were taken to Media and Mesopotamia after the fall of Samaria, 721 B.C. (2 Kings 17:6). The kingdom of Judah was similarly dealt with by Babylon (587 B.C.). But while Scripture narrates the return of the captives of Judah, it is silent regarding the fate of the exiled natives of the northern kingdom, so that the ten tribes comprising it simply disappear from history. Many inquirers have busied themselves with speculations as to what became of the expatriated people. One of the most recent theories is that the 'lost tribes' are none other than the inhabitants of Great Britain and the United States say the Anglo-Celtic pcoples. Though boldly promulgated by both journals and books (see Philo-Israel, An Inquiry estab-lishing the Identity of the British Nation with the Lost Tribes, 5th ed., 1899), the theory cannot be said to make progress.

Lostwithiel, munic. bor. and mrkt. tn., on the Fowey, Cornwall, England, 5 m. s.s.E. of Bodmin; was one of the four Cornish towns empowered to coin and sell tin.

Pop. (1901) 1,331.

(i.) Department, S.W. Lot. France, bounded on the N. by Corrèze, on w. by Dordogne, on s. by Aveyron. The surface is very varied. The river Lot, with its tributary the Cele, and the river Dordogne, drain the department to the Gironde. The river valleys are very fertile,

yielding wheat, oats, barley, rye, and maize. Tobacco, hemp, and fruits are grown. About six per cent. of the department is under vineyards. The manufactures include flax-spinning, tanning, and the manufacture of coarse cloths. There are three arrondissements-Cahors (cap.), Figeac, and Gourdon. Area, 2,018 sq. m. Pop. (1901) 226,720. (2.) River, France, rises in the mountains of Lozère, and flows W. through the departments of Lozère, Aveyron, Lot, and Lot-et-Garonne, and falls into the Garonne at Aiguil-Length, about 300 m., of lon. which 194 are navigable.

Lot, a character of Hebrew patriarchal times, the grandson of Terah, and the nephew of Abraham, with whom his history is largely connected. The two The two left Haran together, proceeded to Canaan, journeyed to Egypt, returned, and afterwards separated, Lot choosing a settlement near Sodom. While living there Lot was captured by the four kings, but was rescued by Abraham (Gen. 14). Being forewarned of the imminent destruction of Sodom, he escaped with his family-his wife, however, being turned into a pillar of salt as the penalty of looking back. Lot was regarded as the ancestor of the Moabites and Ammonites (Gen. 19).

Lot-et-Garonne, dep., S.W. France, is bounded on the N. by Dordogne, on s. by Gers, on w. by Gironde, and on the E. by Tarn-et-Garonne. The department is traversed from s.E. to N.W. by the Garonne, and from E. to W. by the Lot, a tributary of the Garonne. The department is formed mainly of parts of Guienne and Gascony, and is very fertile. The soil is highly cultivated, and grapes, wheat, maize, barley, potatoes, tobacco, hemp, and plums are grown. Iron deposits are numerous. There deposits are numerous. are four arrondissements-Agen (cap.), Marmande, Nérac, and Villeneuve-sur-Lot. Area, 2,078 Villeneuve-sur-Lot. Area, 2,078 sq. m. Pop. (1901) 278,740. Lothaire I. (795-855), emperor

of the Holy Roman empire, eldest son of Louis the Pious, on whose death (840) he claimed the title. Though opposed and defeated at Fontenay (841) by his brothers, the treaty of Verdun (843) secured to him Italy and some provinces of France. He gave his name to Lotharingia (Lorraine).

Lothaire II., THE SAXON (1075-1137), emperor of the Holy Roman empire, became duke of Saxony through his wife, and king of Germany by election. See Bryce's Holy Roman Empire. Lothians, THE, dist. of Scot-

land, includes the counties of Haddington, Edinburgh, and Linlithgow, named respectively East, Mid, and West Lothian. From 517 to 1018 the district formed part of the kingdom of Northumbria.

Loti, Pierre, pseudonym of Louis Marie Julien Viaud (1850), French novelist, born at Rechefort; entered the French navy (1867), and became lieuten-ant (1881). In 1879 he produced his first tale, Aziyadé, a story cf the Bosporus; and in rapid succession followed Le Mariage de Loti (1880); Le Roman d'un Spahi (1881), a powerful study of a soldier in Africa; Mon Frère Yres (1883); Le Pêcheur d'Islande (1886), the most popular of his books; Madame Chrysanthème (1887); Propos d'Exil (1887); Japonneries d'Automne (1889); Le Roman d'un Enfant (1890); Le Livre de la Pitié et de la Mort (1891); Fantôme d'Orient (1892); Le Désert (1894); La Galilée (1895); Ramuntcho (1897); L'Inde sous les Anglais (1903); Vers Ispahan (1904); La Troisième Jeunesse de Mmc. Prine (1905); Les Désrnchantées, Roman des Harems Tures Contemporains (1906). His books are lacking in much that goes to make up a plot, but as an impressionist he is eminently successful. Pierre Loti was admitted to the French Academy in 1891.

Lotions are aqueous solutions of medicinal substances. Many are in use, but for their specific definitions the British Pharmacopæia must be consulted.

Lotophagi, or LOTUS-EATERS, in ancient Greek legend, a people met with by Odysseus in his wanderings. They ate the fruit wanderings. They ate the fruit and drank the juice of a plant which had the property of causing a man to lose all desire to return to his own land. In historical times the Greeks became acquainted with tribes on the north coast of Africa, near the Syrtis Minor, whose chief food was a plant which they called the lotus; and they therefore placed the Lotophagi of the Odyssey on that coast. See Tennyson's Lotoseaters.

Lots, CASTING, a mode of divination practised by many ancient peoples. It was used extensively among the Hebrews, though we do not know the means employed, and was regarded as a legitimate mode of ascertaining the Divine will (cf. Prov. 16:33—The lot is cast into the lap; but the whole disposing thereof is of the Lord'). Thus, it was used to discover a criminal—e.g. Achan (Josh. 7:14), criminal—e.g. Achan (Josh. 7:14), Jonah (1:7); or the right man for an office—e.g. Saul (1 Sam. 10:20 f.), Matthias (Acts 1:26). The division of territory among the tribes was also determined by casting lots (Num. 33:54), whence the use of the term lot to indicate a possession, both literally and figuratively (Josh. 15:1; Ps. 16:5); likewise the choice between the goat offered to Jehovah and the so-called scapegoat. See Azazel, Urim and Thummim, and Benzinger's Hebraische Archäol-

ogie.

Lottery. A lottery, or 'a distribution of prizes by lot or chance,' although at one time permissible, is now rendered illegal by a great number of acts from 1698 onwards, the most important of them being the Gaming Act, 1802, which constitutes the sale of tickets for a lottery in Great Britain or a foreign country as an illegal transaction. Both those who keep lotteries and those who subscribe to them are liable to penalties, the former being also liable to conviction as 'rogues and vagabonds.' The distribution of prizes must depend upon chance; for if there is a real element of skill imported into the transaction, it is not a lottery. So, where a newspaper offered to its readers a prize for a correct prediction of the number of births and deaths in London during a specified future week, the offer was held not to constitute a lottery within the Lottery Acts. It is immaterial whether the lottery is of a public or private character, or whother its object is purely charitable cr otherwise. Thus, a club sweep-stake and a church raffle are both illegal, as being contrary to the Lottery Acts. The so-called 'missing word' competitions have also been held to be illegal. See also ART UNION.

Lotto, LORENZO (c. 1480-c. 1556). Italian painter, born at Venice. Among his paintings, which are practically all concerned with religious subjects, are the Betrothal of St. Catherine, now at Munich; Christ's Farewell to his Mother, in the museum at Berlin; and a Holy Family, in the Uffizi Gallery at Florence. See Berenson's

Lorenzo Lotto (ed. 1905). Lotus, a genus of plants of the crder Leguminosæ. Most of the species have four or five foliate leaves, and produce their flowers in umbels or axillary peduncles. The calyx has usually five equal teeth, and the fruit is a manyseeded cylindrical legume. The two common British species are L. major (the greater bird's-foot trefoil) and L. corniculatus (the common bird's-foot trefoil), both with brilliant yellow flowers in umbels, and common meadow plants. Among the garden species are L. australis, a greenhouse pink-flowering plant about two feet in height; L. jacobæus, also a greenhouse plant, from the Cape Verde Is., hearing dark purple flowers; and L. peliorhyncus, a greenhouse shrub, with scarlet flowers.

Lotze, Rudolf Hermann (1817-81), whose name is perhaps the most important in philosophy since Hegel, was born at Bautzen in Saxony; educated at the Gymnasium in Zittau and the University of Leipzig, his course of studies including medicine as well as philosophy. He was appointed to a professorship at Leipzig (1842), then called to Göttingen (1844) as successor to Herbart, which post he left (1881) to occupy a similar chair in Berlin, where he died soon after entering upon his duties. On the subjects to which his studies were mainly devotedmedicine or biology and philosophy—he wrote largely. The great problem which lies on the border line between them, that of the relations of body and mind, forms the theme of his best-known work on the former subject, his Medizinische Psychologie (1852). His chief philosophical writings are of later date. The most comprehensive of them is the Mikro-kosmos (1856-64), in which his whole system of thought was set forth in a more popular form than that of his academic treatises. He began a more formal exposition of his 'system of philosophy' with a work on Logik (1874), followed by a second work on Metaphysik (1879). The third part, which was to have dealt with ethics, æsthetics, and philosophy of religion, was never finished. He also wrote for a series of histories of the sciences a volume entitled Geschichte Aesthetik in Deutschland (1868). in which his views on art are embodied.

In philosophy Lotze represents a reaction against the speculative movement which culminated in Hegel. One of Lotze's favourite themes was the mechanical view of nature. But his insistence on the mechanical aspect of things did not prevent him from recognizing that mechanism is only the means by which the higher ends of spiritual existence and activity are realized. His philosophy was a reaction against the unduly abstract and logical character of Hegelian idealism, which seemed to sacrifice all the warmth of individual life and feeling, all the peculiar value of concrete processes and things, to the rigid and formal evolution of a great conceptual scheme. Lotze insists on the worth of personality, on the place of feeling, or, in general, on the superiority of content to mere form. An excellent short account of Lotze is contained in a paper in Wallce's Lectures and Essays on Natural Theology (1898); Jones's Philosophy of Lotze (1895) is the first part of an academic criticism. See also Hartmann's Lotze's Philosophie (1888), and Vorbrodt's Prinzipien der Ethik und Religionsphilosophie

Lotzes (1891).

Loubet, EMILE (1838), French statesman, born in the village of Marsanne (dep. Drôme); studied as a lawyer in Paris, and joined the bar at Montelimar, of which town he was elected mayor (1870). He was returned to the Chamber of Deputies as member for Montélimar (1876); joined the Tirard cabinet as minister for public works (1887); and entered the Senate (1885), of which he was chosen president (1895), and again in 1898. In the interval he had been chairman of the finance committee in the Senate (1890), prime minister (1892), and chairman of the customs committee (1893). In 1899 he was elected president of the French republic, in succession to M. Faure. He received the Czar of Russia in Paris, and journeyed to St. Petersburg to return the visit. In June 1903 he entertained King Edward VII., who, a month later, welcomed M. Loubet in London - the first occasion on which the head of the French state had visited London for nearly half a century. Later in the year the king of Italy was the guest of the president in Paris. King Edward again visited him in April 1995, and the king of Spain in May-June of the same year. The president made state visits to Madrid and Lisbon in October 1905. M. Loubet succeeded in bringing about a more friendly feeling between France and Britain than had existed for several generations. See Avenel's Le Président Emile Loubet et ses Président Emile Prédécesseurs (1903).

Loudon, GIDEON ERNEST. Sec LAUDON.

Loudon, JOHN CLAUDIUS (1783-1843), Scottish landscape gardener and horticultural writer, born at Cambuslang in Lanarkshire. He made a thorough study of various methods of agriculture and horticulture, British and European, and embodied the results in the Encyclopedia of Gardening (1822), Encyclopedia of Agriculture (1825), and Encyclopedia of Plants (1829). Loudon's chief work, the Arboretum et Fruticetum Britannicum, was a financial failure, involving him in heavy debt. See Life prefaced to his Self-Instruction for Gardeners (1844).

Loughborough, munic. bor. in Leicestershire, England, on 1. bk. of the Soar, 12 m. N.N.w. of Leicester. Manufactures hosiery, locomotives, machinery, tramears, and electric plant. The church of All Saints has a fine 16th-century tower. Pop. (1901) 21,508. See Dimock Fletcher's Historical Handbook to Loughborough (1881), and his Parish Register of Loughborough (1873).

Loughrea, mrkt. tn., Co. Galway, Ireland, 10 m. s.e. of Athenry; has the ruins of a 14th-century castle and a Carmelite friary founded by Richard de Burgh. Pop. (1901) 2,557.

Louis. See Ludwig. Louis IX. (1215-70), king of France, better known as Saint Louis, may be regarded as the highest type of ruler produced by the Roman Catholic and feudal world of the middle ages. Despite his sincere Catholicism, he showed no subservience to the papacy. Under him the administrative and judicial systems of France were developed. All his legislation shows remarkable humanity. The only part of his rule that can be charged with weakness is his readiness to enter on the crusading movement. He attacked Egypt (1248), but was defeated at Mansourah and taken prisoner (1250). He again sailed (1270), this time for Tunis, but died of plague immediately on landing. See Joinville's Histoire de Saint Louis (1874), and Perry's Saint Louis (1901).

Louis XI. (1423-83), king of France, the eldest son of Charles VII., was born at Bourges. He raised France from the degradation of the Hundred Years' war, and gave to the government the unity and vigour that the times required. His chief enemies were the feudal nobles in alliance with Charles the Bold, Duke of Burgundy. In this struggle he suffered some severe disasters, and in 1467 was actually a prisoner in the hands of Charles at Péronne. In his internal administration he made great use of the new ideas of Roman law which were fast coming into vogue. He has been called the first of modern statesmen, and may be compared to his younger contemporary, Henry VII. of England. See Michelet's Louis XI. et Charles le Téméraire (1853), Legeay's Histoire de Louis XI. (1874), and Willert's The Reign of Louis XI. (1876).

Louis XIII. (1601-43), king of France, son of Henry IV., born at Fontainebleau; ascended the throne at the age of nine. His reign was at first completely dominated by his mother, Marie de' Medici; and when she was pushed aside, he was again the apparently passive instrument of Richelieu's policy. Richelieu became minister (1624), and thenceforward ruled France with almost absolute sway. (See RICHELIEU and FRANCE.) The general lines of Richelieu's policy were doubtless approved by the king. If Louis XIII. had not given a general approval to these objects, Richelieu could not have pursued them; but it is impossible to trace his personal influence on the policy of France. Richelieu's policy was opposed by every member of the royal family ex-cept the king. On several occa-sions it was believed that the king would be forced to abandon his minister. The two most critical occasions were November 1630 and in 1642. The first is known as the 'Day of Dupes.' The queen induced the king to dismiss some of Richelieu's agents, and it was believed that the cardinal minis-ter must himself fall. But he recovered his ascendency, and the queen-mother and his brother, Gaston of Orleans, had to fly from France. On the second occasion the king was much influenced by two young courtiers, De Thou and Cinq-Mars. Richelieu, however, discovered their treasonable intrigues with Spain, and had them executed. The king and his great minister both died soon after-See Malingre's Histoire wards. de Louis XIII. (1646), Bazin's Histoire de France sous Louis XIII. (1837), Zeller's Etudes critiques sur le Règne de Louis XIII. (1879-89); Batiffol's Au Temps de Louis XIII. (1993); and Perkins's Richelieu and the Growth of

French Power (1900).

Louis XIV. (1638-1715), king of France—the Grand Monarch, as he was almost officially called -was the late-born son of Louis XIII. His reign saw the splendour and strength of the French monarchy reach and pass its zenith. It falls naturally into three periods: (1) From his accession (1643) to the death of Mazarin (1661)—during this period he reigned but did not rule; (2) from 1661 to 1685—this was the period of his greatest prestige and power, both at home and abroad; (3) from 1685 to his death (1715)—the political and military situation became decidedly un-favourable to France, and the king's popularity was much diminished. (1.) During the first period of his reign France was really governed by his mother, Anne of Austria, and the Italian Cardinal Mazarin, to whom she was probably married. (2.) On the death of Mazarin (1661) Louis XIV. assumed the reins of government. The first years of his personal rule were occupied in an attempt - presided over by Colbert - to improve the financial system of France, and to foster the growth of industry by an elaborate protective system. Then France became involved in a long series of wars. Those falling within the second period are the war of devolution (1667) and the war against Holland (1672-8). During all these years the court of Louis XIV. was brilliant in the extreme. The literary glory of France was at its height, and the king's protection of Molière deserves especial men-

tion. (3.) The third period (1685-1715) is marked at home by the growing pietism of the king under the influence of his second wife, Madame de Maintenon, and by the persecution of the Huguenots and the Jansenists. The withdrawal of protection from the Protestants of France by the revocation of the Edict of Nantes (1685) was the worst blunder as well as the greatest crime of the reign. See Voltaire's Siècle de Louis XIV. (1751), James's The Life and Times of Louis XIV. (1838), Chotard's Louis XIV. (1890), Saint-Amand's La Cour de Louis XIV. (Eng. trans. 1894), Hassall's Louis XIV. and the Zenith of the French Mourrehy (1895), Pardoe's Louis XIV. (1902), Haggard's Louis XIV. in Court and Cump (1904), and Barine's Louis XIV. et La Grande Mademoiselle (1905). Louis XV. (1710-74), king France, the great-grandson

of France, the great-grandson of his predecessor, Louis XIV., was brought to the throne by a series of deaths in the royal family which were by lying rumour attributed to the Duke of Orleans, who became regent. After the death of Orleans the chief minister was Fleury, and he ruled France in the king's name

down to his death, in 1743. Louis XV., except during a few years after his majority, was indolent, sensual, and suspicious, without any sense of duty or talent for affairs. He was ruled by his mistresses, of whom the most famous were Madame de Pompadour and Madame du Barry. Abroad, France engaged in two great wars. The war of the Austrian Succession (1741-8) brought some striking successes to the French arms; but in the Seven Years' war (1756-63) which followed, France was crushingly defeated by Frederick the Great, and lost to England both Canada and India. At home, meanwhile, a vigorous opposition was_rising up. The Parliament of Paris resisted the taxation edicts of the king; the church suffered a severe blow in the suppression of the Jesuit order (1764); the whole tone of literature was becoming revolutionary, and the corruption and extravagance of the reign did much to provoke the great outbreak of the revolution. See Voltaire's Histoire du Siècle de Louis XV. (1768-70), Carlyle's French Revolution (1837), Carro's La France sous Louis xv. (1891), Saint-Amand's La Cour de Louis xv. (1894; Eng. trans.), Perkins's France under Louis XV. (1897), and Haggard's The Real Louis the Fifteenth (1906).

Louis XVI. (1754-93), king of France, the grandson of Louis XV., was left with the terrible legacy of Louis XV.'s misgovern-

ment. His first act was to appoint a reforming ministry, containing Malesherbes and the great Turgot. For less than two years Turgot was allowed to work at his scheme of reforms, the adoption of which might have averted the revolution; but he was overthrown through the opposition of the queen, Marie Antoinette. Turgot was succeeded by Necker, Calonne, and Loménie de Brienne; but no further attempts at a thorough-going reformation of the system of government were made. The situation was further complicated by the outbreak of the war with England on behalf of the colonies of N. America (1778). The war was a very glorious one for France, and it was very largely her assistance that gained for America independence in 1783. But the expenses of the war still further ruined the finances of France, and the republican example of America proved contagious. The king played no very important part in the events that preceded the revolution, but it was largely on his own responsibility that Necker was recalled (1788) and the States-General summoned.

Louis XVI. was weak of will, and constantly under the influence of his wife or his brother. His policy was consequently vacillating and fatal. In October 1789 he was compelled to leave Versailles and take up his residence in Paris, and was thenceforward a prisoner in the hands of the revolutionists. The king and queen escaped from the palace (June 1791), and tried to join the army on the frontier; but they were caught at Varennes, and were brought back to Paris. In September 1791 he accepted the new constitution: but the ardent revolutionists believed that the deposition of the king was the only road to national salvation. On Aug. 10, 1792, the palace of the Tuileries was attacked, and the king forced to take refuge with the Assembly. The monarchy the Assembly. The monarchy was immediately afterwards suspended, and the convention was called together. The abolition of the monarchy was not deemed sufficient. The king was brought sufficient. The King was caused to trial, found guilty of a conspiracy against the nation, and suilletined on Jan. 21, 1793. See Droz's Histoire du Règne de Louis XVI. (1839-42); Thiers's Histoire de la Révolution Française (1824-27); Johez's La France sous Louis XVI. (1877-93); Nicolardot's Journal de Louis XVI. (1873); Souriau's Louis XVI. et la Révolution (1893). Louis XVII. (Louis Charles)

Louis XVII. (LOUIS CHARLES) (1785-95), titular king of France, was the second son of Louis XVI. He never reigned, and died when the reign of terror was at its height, a prisoner in the Temple.

The obscurity of his fate allowed various impostors to lay claim to his inheritance; but though some of them still have their strong supporters, the facts of his death seem beyond doubt. See Stevens's The Lost Dauphin (1887), Evans's The Story of Louis XVII. (1893), and Weldon's Louis XVII.

of France (1895).

Louis XVIII. (1755-1824), king of France, brother of Louis XVI., had played during the early part of his brother's reign an obscure rôle in resisting the reforming measures of Turgot and Calonne. Upon the outbreak of the revolution he managed to reach Brussels, and passed the years down to 1814 in exile. But in 1807, after the treaty of Tilsit, he took refuge in England; and in 1814, when Napoleon was sent to Elba, he was proclaimed king, and entered Paris. His reactionary measures did much to prepare the way for Napoleon's last attempt. He was restored to the throne after Waterloo, and his government at first engaged in reactionary and repressive measures. But the obvious discontent of France made a change necessary, and for some years Louis XVIII. vacillated be-tween the two opposing parties. See De Beauchamp's Vie de Louis XVIII. (1825), and Saint-Amand's La Cour de Louis XVIII. (1891). Louis, SIR THOMAS (1759-1807),

Louis, Sir Thomas (1759-1807), British admiral, served in Keppel's action off Ushant (1778), in the first battle off Cape St. Vincent (1780), and commanded the Minotaur (74 guns) at the battle of the Nile (1798). For his services as second in command under Duckworth at San Domingo (1806) he was made a baronet. In 1807 he took part in the operations in the Dardanelles, but died three months later on board his flagship Canopus, off Alexandria.

Louisburg, in., Atlantic coast, Cape Breton I., Brit. N. America. It commands the entrance to the Gulf of St. Lawrence. While the island of Cape Breton remained French, it was an important seaport and fortress, but is now little more than a fishing village. Wolfe took the town and fort before he advanced to the capture of Quebec (1758). In 1904 a memorial fund was started to preserve the remains of the fortress, and to commemorate those who fell in the siege. It has a magnificent harbour, which is never frozen over, and is utilized for the winter export of coal. Pop. 1,116. See Louisbourg in 1745 (Eng. trans. by Professor Wrong), and Bourinot's Memorials of the Island of Cape Breton (1892).

Louis-d'Or, a French gold coin, first struck by Louis XIII. (1640), and used continuously till 1795. Its value varied from 10 francs (1640) to 24 francs (1787).

Louise, QUEEN OF PRUSSIA. See LUISE.

Louise, CAROLINE ALBERTA, PRINCESS (1848), Duchess of Argyll, the fourth daughter of Queen Victoria, married (1871) the Marquis of Lorne, now ninth Duke of Argyll. Princess Louise is a member of the Royal Society of Water-Colour Painters, and is also a talented sculptor, her chief work being the statue of Queen Victoria in Kensington Gardens.



Princess Louise, Duchess of Argull.
(Photo by H. S. Mendelssohn.)

Louisiade Archipelago, group of islands, Oceania, at the southeastern extremity of British New Guinea. The largest islands of the group are St. Aignan and Southeast. Alluvial gold has been found, but reef-mining has not been developed to any extent. The islands were discovered by Torres in 1606, and taken by the British in 1888. The inhabitants are of Papuan and Malayan type.

Louisiana. (1.) One of the southern states of the United States of America, bordering on the Gulf of Mexico, with an area of 48,720 sq. in. It was admitted to the union as a state (1812), having been formed from the Louisiana territory purchased from France (1803). The surface is low, rarely exceeding 300 ft. above sea-level in the highest northern part, and gradually descending to sea-level. Much of its area consists of alluvial and marsh lands, lying along Red R. and the Mississippi, with its distributaries (locally called 'bayous'), while the coast is bordered by a broad strip of marsh. Except where cleared for cultivation, the state is covered with forests, consisting mainly of

pine on the uplands and cypress in the swamps. The capital is Baton Rouge (pop. 11,269), and the chief city and port is New Orleans (pop. 287,104). Farming is the leading industry of the state. The cultivated area (1900) was sixteen per cent. of the total area of the state. The principal crops are cotten, Indian corn, sugar (in the s.e. of the state), and rice. The manufactures of Louisiana are largely concentrated in the city of New Orleans. Chief products: refined sugar, lumber, and cotton-seed oil, and cake. There are 2,800 miles of railway. Pop. 1900) 1,381,625, 47 per cent. being negroes. (2.) City, Pike co., Missouri, U.S.A., on the Mississippi, in a fine fruit and lumber region, 114 m. N.w. of St. Louis. Pop. (1900) 5,131. (Map. 2, 3888.)

Louis Philippe (1773 - 1850), king of the French, the son of Philippe 'Egalité,' who was exccuted during the revolution (1793), was born in the Palais Royal, Paris. As colonel in the revolutionary army he fought at Valmy and Jemappes. But in 1793 he left the army, and visited England and the United States. He returned to France in 1814, and under Louis XVIII. and Charles X. was regarded as the leader of the was regarded as the leader of the Liberal party. Upon the abdica-tion of Charles X. he was made lieutenant-general of the king-dom, and a week later the two Chambers declared him 'king of the French.' He took the oath to the new charter, and prepared to govern on liberal lines. But in 1835, after the dangerous attempt of Fieschi on his life, the laws of September were passed, controlling the press and the methods of political trials. In 1836 Louis Napoleon tried to stir up a rising among the troops at Strassburg, but failed, and was sent to America, whence he made his way to England. In 1840 he landed at Boulogne, and made an unsuccessful attempt to organize an insurrection; on his capture he was condemned to imprisonment for life. In the same year the remains of Napoleon were brought from St. Helena, and were buried in Paris amidst great enthusiasm. The revival of the imperial tradition was a heavy blow against the stability of Louis Philippe's essentially commercial and bourgeois régime. In 1843 the radical socialist party was founded by Louis Blanc, and thus the government of Louis Philippe was attacked from two sides. The entente cordiale between Britain and France, ratified by the visit of Queen Victoria and the prince consort to Paris, was the king's chief support. In 1847 the extension of the franchise was demanded from many sides, and in

1848 the long-prepared forces broke out into revolution. Guizot, the chief minister, resigned. Thiers refused to form a ministry, except on the understanding that reform would be granted. The king thereupon abdicated and fied to England. See Wright's The Life and Times of Louis Philippe (1841), Dumas's Histoire de la Vie Politique et Prirée de Louis Philippe (1852), and Rouvion's Histoire du Règne de Louis Philippe (1861).

Louisville, largest city of Kentucky, U.S.A., and the co. seat of Jefferson co., on the Ohio, at the falls. It is one of the greatest railway centres S. of the

Lourdes, tn., dep. Hautes-Pyrénées, France, on r. bk. of Gave de Pau, 90 m. s.E. of Bayonne; is one of the chief places of Catholic pilgrimage. Its fame dates from 1858, when the Virgin Mary is reported to have appeared to a girl of thirteen, Bernadette Soubirous. The famous spring rising from the spot is credited with miraculous powers, and a church was built in 1889 for the accommodation of pilgrims, of whom about 500,000 visit the place annually. Pop. (1901) 8,708. See the Annales de Lourdes, Zola's Lourdes (1894), and Gué's Histoire de Notre Dame de Lourdes (1896).

46

connects Lourenço Marques with the Transvaal system. An outlet to bar gold from Johannesburg, Lourenço Marques is also being utilized as a coaling port. Imports (1905), £1,042,507; exports, £133,643; transit trade, £4,506,467. Pop. (1903) 6,370, of whom 3,319 were whites.

Louse. See LICE.

Lousewort. See PEDICULARIS.
Louth. (1.) Maritime 20.,
Leinster, the smallest in Ireland,
lying between Carlingford Lough
and the mouth of the Beyne.
The surface is low and undulating
in the south and the centre, and
mountainous on the border of
Carlingford Lough. The rivers



Ohio R., and an important river port. The falls here are avoided by a lock. The immense water-power furnished by the falls makes Louisville one of the great manufacturing cities of the south. It is the largest manufacturer and exporter of tobacco in the world. The principal products besides tobacco are packed meats, cotton-seed oil and cake. Louisville was founded in 1780, and named in honour of Louis xvI. of France. Pop. (1900) 204,731.

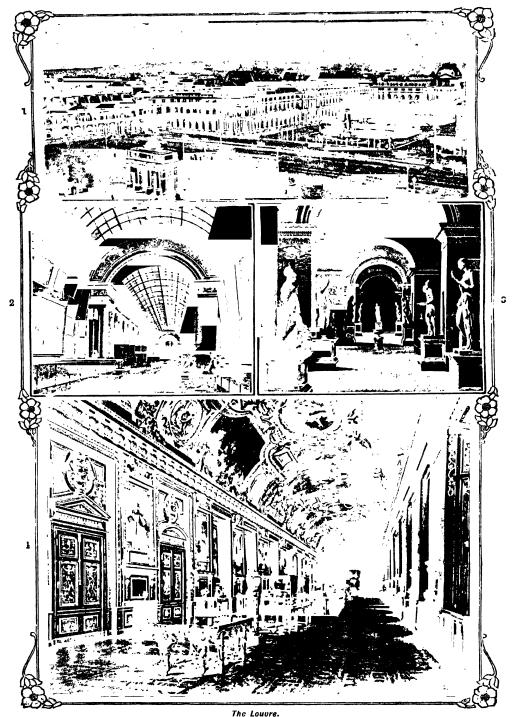
Louie, tn., dist. Faro, Portugal,

Loulé, tn., dist. Faro, Portugal, 10m. N.w. of Faro; trades in palms and esparto grass, and manufactures porcelain and leather. There are copper mines in the vicinity. Pop. (1900) 22,511.

Louping-ill. See Sheep-

Lourenço or Lorenzo Marques. (I.) Most southerly of the three districts of Portuguese E. Africa. Watered by the Lundé and Limpopo, it comprises five sub-districts, including the rich gold-yielding territory of Manica. (2.) Capital of above district, at the mouth of the Espirito Santo, or English R., in the N.W. of Delagoa Bay; was founded (1541) as a Portuguese factory. A railway runs 57 m. within the colony, and thence 290 m. of line to Pretoria, giving a railway route to Johannesburg 80 m. shorter than that from Durban. An agreement (1901) regulates the commercial relations and the transit of goods by this railway between the Portuguese and the British possessions. A telegraph line

include Boyne (on s. border), Dec, Glyde, and others flowing to the Irish Sea. Agriculture is the principal employment; Carlingford Isay is famous for oysters; and linen is manufactured. The county comprises six baronies, and returns two members to Parliament. Dundalk is the county town. Area, 316 sq. m. Pop. (1901) 65,820. (2.) Town, Lindsey division, Lincolnshire, England, 15 m. E.S.E. of Grimsby. St. James's Church was founded in the 12th century. The town is chiefly an agricultural centre, with ironfounding, manufacture of agricultural implements, and other industries. The Louth navigation canal (constructed 18th century) connects with the Humber. Area, 2,651 ac. Pop. (1901) 9,518.



The Louvre.

1. The Louvre, from the Place du Carrousel. 2. Gallery of Paintings. (Photo by Frith.) 3. Gallery of the Venus of Milo. (Photo by Frith 4. Gallery of Apollo.

Louvain, or LÖWEN, tn., Belgium, prov. Brabant, 18 m. E. by N. of Brussels. It is famous for its university, founded in 1426, now attended by some 1,600 students. Manufactures beer, lace, starch, and tobacco. Its town hall (one of the finest on the Continent) and the church of St. Gertrude, both of the 15th century, are the chief features of the town. Pop. (1900) 42,070. See Van der Linden's Histoire de Louvain (1892).

Louviers, tn., dep. Eure, France, on riv. Eure, 17 m. s.r. of Rouen; has a very fine Gothic cathedral dating from the 13th

are now generally used for ventilation, and overlapping sloping boards are so fixed in the opening that air is admitted between them and rain excluded. Similarly, in a belfry, louvre-boards serve to direct the sound downwards.

Louvre, The, a magnificent pile of buildings facing the Seine in Paris; formerly a royal palace, now a museum of art treasures, has been known under its present name since the time of Philippe Auguste (1204). Succeeding kings of France made additions and reconstructions. Two of the existing façades were the work of

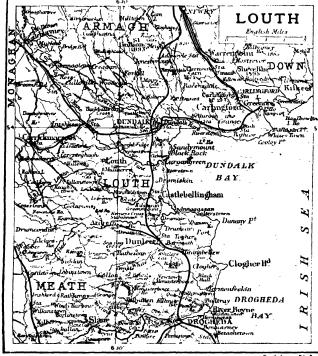
jects of art in the world. On the ground floor is to be seen the famous Venus of Milo (discovered 1820), the Pallas of Velletri, and other priceless statues. In the Salon Carré are masterpieces of painting by Raphael, Titian, Leonardo da Vinei, Giorgione, Correggio, Paul Veronese, Tintoretto, Rubens, and others. Next to the French school, the Italian is best represented; but there are examples of most of the great artists of Europe in the galleries, and of late years a considerable number of works by British artists have been acquired. See Potter's The Art of the Louvre (1904).

Lovage (Liquisticum scoticum) is a perennial herbaceous plant, order Umbelliferæ, and native to Britain. It hears pinkish-white flowers in umbels of many rays and pinnately-divided leaves.



Lorage (Ligusticum scoticum).
1, Flower; 2, fruit; 3, section of half fruit.

Lovat, SIMON FRASER, TWELFTH LORD (?1667-1747), Scottish Jacobite intriguer, was descended from a Peeblesshire family, one of whom obtained the fort of Lovat, Inverness-shire. By the will of his cousin, the tenth Lord Lovat (who died in 1696), the Lovat estates were made over to Fraser—his father, who had a life rent of them, assuming the title of Lord Lovat, and Fraser himself that of Maxter of Lovat. As Emilia, daughter of the tenth lord by Lady Amelia Murray, only daughter of the first Marquis of Atholl, claimed the honours, Fraser planned to carry her off and marry her; and failing accidentally in this, he seized instead her mother, whom he compelled to submit to a marriage



Bartholomew, Edin

century. Manufactures cloth, machinery, and leather. Pop. (1901) 10 219

Louvois, François Michel Le Teller, Marquis De (1641-91), war minister under Louis XIV., was the first to organize a standing army for France. He set on foot systems of commissariat and hospitals, and established the Hôtel des Invalides in Paris (1674). See Rousset's L'Histoire de Louvois (ed. 1891).

Louvre, or Louver (Fr. Vouvert, 'the opening'), an ornamental outlet for smoke on the roof of a building, usually in the shape of a turret or a lantern. Louvres

Pierre Lescot, the architect of Francis I., while the eastern wing was designed by Claude Pérrault for Louis XIV. The revolution of 1789 found the palace still unfinished, the republican government (1793) converting it into a national museum, while Napoleon continued their work of reconstruction. Not till after the revolution of 1848 was the building completed and connected with the Tuileries. In 1900 two new galleries were added, and it is now the most extensive museum in Europe, containing the richest collection of pictures, statues, antiquities, gems, and other ob-

ceremony. For this he and his father were condemned to be executed (1698), but they eluded capture; and in 1700, Fraser, who now, his father being dead, claimed to be Lord Lovat, endeavoured to secure a pardon from King William. He obtained indemnity for his political of-fences, but for his outrage on the Dowager Lady Lovat he was outlawed (Feb. 17, 1701). Compelled to flee to France, he there endeavoured to win the confidence of the Jacobites by becoming a convert to Catholicism. At the request of the clan he resolved to return home (1713). Though arrested in London, he was liberated on heavy bail, and, by siding with the government in the '15, secured full pardon and also the life rent of his estates. In 1730 his claims to the Lovat dignities and honours were sanctioned by the Court of Session; and in 1733, Mackenzie, the husband of the Lovat heiress, resigned his claims to the honours and estates for a sum of money. Becoming incautious in his intrigues with the Jacobites, he was deprived by the government of all his official dignities. Vengeance, therefore, made him eager for the success of the Young Chevalier in 1745. After Cul-loden he sought concealment, but was taken prisoner, brought to London, and after a trial by his peers condemned and be-headed on Tower Hill. See Lovat's Memoirs (1797), Hill Burton's Life of Simon, Lord Lovat (1847), Fraser's Chiefs of Grant (1883), and Major Fraser's Manu-

script (edit. by Fergusson, 1888). Lovat, Simon Joseph Fraser, SIXTEENTH BARON (1871), Scottish soldier, was a lieutenant in the 1st Life Guards from 1893 to 1897. In the early stages of the Boer war (1899-1902) the War Office accepted his offer to raise Scottish gillies, for service in S. Africa, designated 'Lovat's Scouts,' with Lord Lovat in command. They remained in the field until the close of the war, and their services were favourably reported upon both by Earl Roberts and Viscount Kitchener. Lord Lovat was mentioned in dispatches, and received the dispatches, D.s.o. (1900) and was made a C.B. (1902) for his services, and subsequently a C.V.O. Lovat's Scouts now form the 55th company of the Imperial Yeomanry. Love. The emotion enters

into various states, either as an element or as the substance— parental love, fraternal love, the love of the sexes, benevolence, pity, gratitude, sorrow, admira-tion, esteem, æsthetic emotion tion, esteem, sethetic emotion, religious emotion, and many varieties of these. Tender emotion may extend to the animal world, and in a strict sense may have significance for the inanimate, as in the love of particular places, countries, homes, etc. Love in its most characteristic forms is the concentration of tender feeling on a person and in the love of the sexes. Of the emotion as a mental state, distinguishable elements are: desire for presence of the person loved, and pleasure in such presence; depression at parting; longing for and focus-sing of whole imagination on the memory of the absent one. In the case of maternal love most of these features are pronounced; in love of the sexes they nor-mally accompany the establishment of sexual maturity. This is the period of ideals, and is characterized by an enormous expansion of emotional and intellectual interests. The mating instinct becomes active. Maternal and paternal love are natural sequels of the mating instinct. The expression of tender feeling in all its forms involves, in varying degrees, the whole vasomotor system, in particular the lachrymal glands, tears being associated both with joy and sorrow. From the evolution standpoint, the tender emotion accords generally with Darwin's theory. (See EMO-TIONS.) All the emotional preliminaries of mating-love and courtship—have analogues in the lower animal world, and it is easy to assign selection value to most of them; but the full explanation of love for one only person is yet to seek. The concrete psychology of love is best studied in the great poets and novelists of all nations. As indicating phases and varieties, the following are typical artistic expressions: Shelley, The Indian Sercsions: Shelley, The Indian Serenade; Landor, Rose Aylmer; Milton, Lycidas; Tennyson, In Memoriam and Locksley Hall; Swinburne, Triumph of Time; Meredith, Modern Love; Keats, The Eve of St. Aynes; Shakespeare, Romeo and Juliet. See Bain's The Emotions and the Will (1859), and Mental and Moral Science (1868); Höfding's Die Psychologie in Umrissen (1892); Mercier's Sanity and Insanity (1890); Krafft-Ebing's Psy sanity (1890); Krafft-Ebing's Psychopathia Sexualis (new Eng. trans. 1899); and Darwin's Descent of Man (1871).

Love-bird, a name applied to small parrots belonging to two different genera. The true lovebirds (genus Agapornis) are in-habitants of Africa, while the green love-birds of the genus Psittacula inhabit South and Central America. The members of both genera are remarkable for the great affection which appears to exist between males and females, and for their habit of sitting huddled close together; but the statement that if one of a pair should die, its mate will also die from grief, is denied by natu-Examples of African love-birds are Agapornis reseicollis of S. Africa and A. cana of Madagascar. See PARROT.

Lovedale, an educational and mission station, Cape Colony, 30 m. W.N.W. of King William's Town. Founded by Scottish missionaries in 1841, it has been supported by the Free (now United Free) Church of Scotland.

Love-feasts. See AGAPÆ. Love-in-a-mist, FEN FENNEL FLOWER, and DEVIL-IN-THE-BUSH are names given to certain species belonging to the genus Nigella, a subdivision of the Ranunculacea. They are hardy annual plants, chiefly natives of the south of Europe. The flowers are mostly blue or white in colour, and are surrounded by mossy involucres, which seem to envelop the flowers in mist. The leaves are much divided. See NIGELLA.

Love-in-idleness, one of the old English popular names of the pansy or heartsease (Viola tricolor).

Loveira, or LOBEIRA, VASCO DE. See AMADIS OF GAUL

Lovelace, RICHARD (1618 58), English poet and Cavalier, was born at Bethersden, and educated at Charterhouse and at Gloucester Hall, Oxford, where he wrote a comedy, The Scholar, and a tragcomedy, The Soldier, that a trag-edy, The Soldier, both lost. He shone at court, but preferred war-fare. In 1645 he took arms on behalf of the king; and in 1646 he was fighting for France against Spain, and was wounded at Dun-kirk. On his return he was imprisoned at Aldersgate, and occupied his captivity with preparing his poems for the press. His Lucasta (1649) was probably Lucy Sacheverell, who is said to have married another on a false report of his death at Dunkirk. His brother published Posthume Poems of Richard Lorelace (1659); an edition by Hazlitt, Collected Poems, appeared in 1864; and

another in 1904. Love-lies-bleeding, a popular name for the flowering plant Amaranthus caudatus, belonging to the order Amaranthaceæ. It is a common annual garden plant, bearing a crowded inflorescence in the form of a spike often sev-

Lovell, ROBERT (?1770-96), English poet, was the friend of Southey and Coleridge, and a participator in their 'pantiso-cratic' project; but Lovell's early death prevented its realization. In 1794-5 Southey and he published Poems by Bion and Moschus, showing the democratic feeling and love of nature common to the Lake school of poetry.

Lover, SAMUEL (1797-1868), Irish novelist, ballad-writer, and painter, born and educated in at first devoted himself chiefly to painting, becoming (1828) a member of the Royal Hibernian Academy. From 1835 he was a popular miniature painter in London, and at the same time made successful efforts in literature, his well-known song Rory O'More being written in 1826. Several plays, some novels—especially Handy Andy (1842) and numerous songs, including The Angel's Whisper, followed in quick succession. See Bernard's Life of Samuel Lover (1874), and Symington's Samuel Lover a Sketch (1880).

Low, Sir Robert Cunliffe (1838), British general, was born in Fifeshire: entered the Indian same time made successful efforts

in Fifeshire; entered the Indian army (1855), and served with distinction in India, Afghanistan, Burma, and throughout the Indian mutiny. He was director of transport in the Afghan war of 1879 80, and did good service in Lord Roberts's famous march to Kandahar. During the Burmese war of 1886-8 he had command of a brigade, and for his services received a K.C.B. One of Low's most successful commands was that of the Chitral relief force in 1895, for which he was awarded a G.C.B., and promoted to the rank of lieutenant-general.

Low, SETH (1850), American politician, was born in Brooklyn, and graduated at Columbia University. He was mayor of Brook-lyn (1881-5), president of Columbia University (1896-1901), mayor of New York (1901-3), and a deputy to the peace conference at the Hague (1899).

Low Archipelago, PAUMOTU, or TUAMOTU, archipelago of about eighty low coral islands in the Pacific, to the E. of the Society Is., between lat. 14° and 24° s. and long. 135° and 149° w. Total area, about 350 sq. m. Pearl ti heries are a source of wealth. The group was discovered (1606), and was officially annexed to France (1881). Pop. about 7,000.

Low Countries. See BELGIUM. Lowe, SIR DRURY CURZON DRURY- (1830), British soldier, served in the Crimea (1855-6), the Indian mutiny (1858-9), the Zulu war (1879), the Boer war (1881), and specially distinguished himself in Egypt (1882), commanding the cavalry division, and following up the victory of Tellel-Kebir by pursuing Arabi into Cairo, where the latter gave up his sword to him. For his services he was thanked by Parliament, and received a K.C.B (1883) and a G.C.B. (1895).

Lowe, EDWARD JOSEPH (1825-1900), English botanist, was born at Highfield, near Nottingham. From 1840 to 1882 he made a valuable series of daily meteorological observations, and he has written numerous works and papers on meteorology, but is best known for his botanical works, which include Natural History of British and Exotic Ferns (1856-8), British Grasses (1858), Beautiful Leaved Plants (1861), New and Rare Ferns (1862), Our Native Ferns (1865), Handbook on the Varieties of British Ferns (1891), and The Ferns of Great Britain and their Varieties (1893-4).

Lowe, Sir Hudson (1769-1844), British general and governor of St. Helena, born in Galway, joined the army (1787). He then filled various posts of responsibility, both as military commander and as civil administrator, till appointed custodian of the Emperor Napoleon (1815) and governor of St. Helena, both of which duties he discharged until the death of Napoleon (1821). Charges of inhumanity were brought against Lowe, but apparently without cause; for the strained relations which existed between him and his prisoner were due rather to tactlessness than to any lack of good inten-tions on the part of Lowe. See Memoir in Colburn's United Service Magazine (April and June 1844), Forsyth's Captivity of Napoleon at St. Helena (1853), Scaton's Sir Hudson Lowe and Napoleon (1898), and Rosebery's

Napoleon, the Last Phase (1900). Lowe, ROBERT. See SHER-See Sher-BROOKE

Lowell, city, Massachusetts, U.S.A., the co. seat of Middlesex co., on the Merrimack R., 25 m. N. of Boston. It has extensive manufactures of cotton and woollen goods, carpets, and machinery.

Lowell, James Russell (1819-

Pop. (1900) 94,969.

91), American poet, son of a nonconformist minister, born at Cambridge, Massachusetts, graduating at Harvard (1838), studied law, but soon took to literature. Lowell became professor of modern languages and literature at Harvard (1855), afterwards travelling in Europe to extend his knowledge. He was editor of the Atlantic Monthly (1857-62), and, with Professor Norton, of the North American Review (1864-72). In 1877 he was appointed United States minister at the court of Madrid, and from 1880-5 filled the same office in London. In 1841 Lowell published A Year's Life, and Other Poems, a distinct advance on which, both in manner and form, is noticeable in Poems (1844). Conversations on Some of

the Old Poets (1845) is a pioneer

of the author's critical method and skill; while the Mexican war

of 1846 stimulated his poetical

masterpiece, The Biglow Papers

(1848), which placed Lowell in the first rank of modern humorists. A second series (1867) was prompted by the civil war. Contemporary with the first series of the Biglow Papers are an Arthurian Vision of Sir Launfal (1848), a spirited Ode to France (1848), and a rictously vivacious Fuble for Critics (1848). An adequate Commemoration Ode (1865) is also devoted to the Harvard heroes lost in the civil war. The poet's nimble fancy and love of natural beauty are illustrated in Under the Willows (1868). Several occasional poems of later years—The Cathedral (1869), On the Death of Agassiz (1874), and three patriotic odes (1875-6)—are specially meritorious. The concluding volume of poems was Heartsease and Ruc (1888). Lowell's essays are learned, happily allusive, and graceful. Fireside



James Russell Lowell.

Travels (1864), My Study Windows (1871), Among my Books, two series (1870-5), all have descriptive and critical articles of permanent value and charm. Democracy, and Other Addresses (1887) contains several admirable orations delivered by the author when minister in England. Political Essays (1888) touch on American interests in the latter half of the 19th century. Latest Literary Essays appeared (1892), and Impressions of Spain (1900). See Lowell's Letters, edited by Nor-ton (1894), Hale's James Russell Lowell and his Friends (1899), and Greenslet's J. R. Lowell (1906).

Löwenberg, tn., prov. Silesia, Prussia, on the Bober, 27 m. w.s.w. of Leignitz. In the vicinity are gypsum and sandstone quarries. There are also linen, cotton, and woollen mills. Pop. (1901) 5,290.

Lower Austria. See Austria, LOWER.

Lowestoft, munic. bor., seapt., and bathing resort in Suffolk, England, 10 m. s. of Yarmouth. It is a rising and fashionable place, near the Norfolk Broads, with excellent yachting accommodation and a bracing climate. The town comprises two parts. The north, or old town, is situated on a cliff, below which is a tract called The Denes, with golf links, bordering the shore. St. Margaret's Church is a beautiful 14th-century edifice with earlier tower. Kirkley has a fine esplanade and sea-wall connecting with the south (promenade) pier. A fine esplanade has also been constructed above the Denes at the N. end of the town. The fisheries are important. Pop. (1901) 29,842. Off the coast, on June 3, 1665, a great naval battle took place between an English fleet under James, Duke of York, and a Dutch fleet under Obdam van Wassenaer. Obdam was killed, and the Dutch were driven to their ports.

Lowicz, tn., Warsaw gov., Poland, W. Russia, 45 m. w.s.w. of Warsaw; cap. of district, on the Bzura. Industries include flax, manufacture of refined wax, and tanneries. Pop. (1897) 12,434.

Lowland in general means land which does not rise more than from 600 to 1,000 ft. above the sea. Its limit is usually represented on orographical maps by the 600 ft. or 200 metre contour lines. Accepting the 200 metre (600 ft.) line, and excluding Antarctic lands, the area of lowlands is nearly three-tenths of the total land surface, or 154 million sq. m. This is on the N. of the mid-world mountain system in Eurasia, and W. of the Pacific mountain system in Eurasia, and w. of the Pacific mountain system in America. There is little in Africa (15 per cent.), mainly in the N. and W. of the Sahara, and 55 per cent. in Europe, while in Australia the lowland E. of the Eastern highlands is extensive, and raises the percentage to 36.

All kinds and ages of rocks can be found in the lowlands. They may be composed of ancient crystalline rocks, as in the Baltic and Hudson regions; of flat Palæozoic rocks, as in the tabular plains of Russia and N. America adjoining these; or of recent deposits, as in the marshy lands of Western Siberia, in growing deltas, such as that of the Nile, in marine accumulations on rising coastal areas, as in the low-lying Floridas and the coastal plain to the N., in desert areas of windbared or sand-covered surface, as in Turan and the lower parts of the Sahara. They may also be underlain by rocks greatly faulted or folded, or both, as in the lowlands of Belgium.

The lowlands of the world present every variety of vegetation, according to the climatic regions in which they are found, and also every phase of economic development. They are among the least-peopled (e.g. low-lying tundra and desert) and the most densely-populated parts of the globe, such as N. China, Ganges, and Belgium, with over 500 persons per sq. m. Where the climate and drainage permit, they are the most favoured lands, and easy to exploit and to traverse.

Low Sunday, the Sunday after Easter; also called Dominica in albis depositis, because those who had been baptized on Easter Eve then first laid aside their white robes. The name Low Sunday was given partly to contrast it with the high festival to which it succeeded, partly perhaps because, as the octave of Easter Day, it was considered a continuation of the feast, though in a lower degree.

Lowth, ROBERT (1710-87), English ecclesiastic and scholar, born



J. W. Lowther, Speaker of the House of Commons.
(Photo by Russell & Sons.)

The stage of economic evolution of the inhabitants is, however, a most important factor in the economic significance of lowlands, as is shown by comparing the worth to the world of the North or South American prairies, and the Russian and Siberian steppes to-day and a hundred years ago. Though the lowlands form only three-tenths of the land, they probably support at least sixtenths of the inhabitants of the world.

at Buriton, Hants; was appointed to the chair of poetry at Oxford (1741), resigning on his appointment to the archdeaconry of Winchester (1750). His short tenure of the see of St. Davids (1766) was followed a few months later by his presentation to that of Oxford, whence he was translated to London (1777). In 1783 he declined the primacy. His De Sacra Poesi Hebrworum Prælectiones Academice (translated in 1787 as Lectures on the Sacrel

Poetry of the Hebrews), published in 1753, marked a new departure, in the application to Biblical poetry of the ordinary criteria of literary criticism. Among his other works are a Life of William of Wykeham (1758); an excellent Short Introduction to English Grammar (1762), often reprinted; and Isaiah: a New Translation (1778). An edition of his Popular Works appeared in 1843. See Life and Writings of Bishop Lowth (1787), and Memoir by Hall in Lowth's Sermons and Other Renatins (1834).

Lowther, JAMES (1840-1904), English politician, called to the bar (1862); began his parliament-ary career as M.P. for York (1865), a seat which he held till 1880, afterwards representing N. Lincolnshire (1881-5). Under Disraeli he became (1868) parliamentary secretary to the Poor Law Board, and under-secretary for the colonies (1874-8), being transferred to the Irish office as chief secretary (1878), a position he held till 1880. He failed to secure re-election for N. Lincoln (1885), and was not seen again in Parliament till 1888, when he was returned (till 1904) for the Isle of Thanet division of Kent. Lowther was a prominent member of

Lowther, JAMES WILLIAM (1855), Speaker of the House of Commons, first entered Parliament as member for Rutland (1883-5), and since 1886 has represented the Penrith division of Cumberland. He accepted office as under-secretary for foreign affairs in 1891; was elected chairman of Committee of Ways and Means and deputy-speaker in 1895, and became Speaker, June 1905, on the retirement of Mr. Gully.

the Jockey Club.

Loyalty Islands, group of islands, consisting of three large and numerous small islands, in the S. Pacific, forming a chain parallel to and includ d in the French administration of New Caledonia, at a distance of 60 m. E. of that island. The larger islands are Uea, Lifu, and Mare. Total area, 800 sq. m. The islands grow bananas and export sandal wood. Pop. (end of 1901) 14,800.

Loyola, Ignatius DE—Inigo Lopez DE RECALDE—(c. 1492–1556), the founder of the Jesuits, born of a noble family in the Spanish province of Guipuzcoa. Like three of his elder brothers, be followed the career of arms; but the perusal of the Life of Christ by Ludolphus, and of certain lives of the saints, induced him to forsake the world and to consecrate himself to the service of religion. He spent ten months in a cave near Manresa, practising terrible austerities, and here he composed the famous book of Spiritual Exercises, which was

to prove so powerful an influence in the training of his followers. It was probably also at this time that the idea began to take shape in his mind of recruiting in the cause of Jesus Christ a regiment (compañia) which should be a corps d'élité, drilled to a most perfect discipline, and ready to volunteer for any emergency or forlorn hope. Having by this time learnt the necessity of educating himself better for the task before him, he went to school with children to learn the rudiments of Latin, and then studied at the universities of Alcala, Salamanca, and Paris. At Paris he gathered round him a small band of companions, the most famous of whom was St. Francis Xavier, and at Montmartre, on Aug. 15, 1534, they all took vows together which bound them to place themselves after an interval at the disposition of the reigning pontiff. These companions came to Rome in 1537, and were cordially welcomed by Paul III., who in 1540 issued a bull approving the new order. Ignatius was elected general (1541), and, in spite of his efforts to resign, was compelled to retain the office till his death. Recruits now poured in, and endless fields of activity, more especially in the form of colleges for the young and missions to the heathen, were opened up for the new Company of Jesus,' as its founder had designated it. Ignatius remained continuously in Rome, writing the constitutions of the order and maintaining a vast correspondence with the members of his society in every part of the world. He was canonized (1622). His day is July 31.

For the early portion of the life of Ignatius, the sole authority is a brief autobiography dictated by himself in 1554. It has been translated by Rix, under the title of The Testament of Ignatius Louola (1900). Of the complete Lives, the best in English are those by Genelli (1871) and Stewart Rose (1870). In French the Life by Bartoli, edited by L. Michel (1893), incorporates the results of modern research. The correspondence of the saint, chiefly in Spanish, is given most completely in the Monumenta Historica Societatis Jesu (1894). See also Druffel's Ignatius v. Loyola (1879), Gothein's Ignatius v. Loyola und die Gegenreformation (1895), and Joly's Ignace de

Loyola (1898).

Lozère, dep. of S. France, formed mainly from the old Languedoc and Gévaudan, and deriving its name from Mt. Lozère, a peak of the Covennes. It is one of the most mountainous departments of France. The mountain pastures bear many

cattle and sheep. There are extensive forests. Iron and lead are mined, and marble, granite, lithographic stone, and slate are quarried. Flax, hemp, and fruits are produced, and silkworms are bred. There are three arrondissements—Mende (cap.), Florac, and Marvejols. Area, 1,996 sq. m. Pop. (1901) 128,900.

L.R.C.P., Licentiate of the Royal College of Physicians. L.R.C.S., Licentiate of the

Royal College of Surgeons.

L.S., loco sigilli—i.e. 'the place of the seal.'

Luang-Prabang, cap. since 1896 of Upper Laos, French Indo-China, on the l. bk. of the Mekong, at the confluence of the Nam-khan. Ppp. about 12,000.

Luapula. See Congo.
Lubao, tn., prov. Pampanga,
Luzon, Philippines, 5 m. s. of
Bacolor, in a rich sugar, indigo,
and rice district. Pop. (1899)
21.175.

Lübben, tn., prov. Brandenburg, Prussia, on riv. Spree, 47 m. s.s.e. of Berlin, has sawmills and shoe factories. Pop. (1900) 6,818.

S.S.E. of Berlin, has sawmins and shoe factories. Pop. (1900) 6,818.

Lubbock, Sir John. See Ave-Bury.

Lübeck. (1) State of the Cor-

Lübeck. (1.) State of the German empire, on either side of the Trave, comprising the towns of Lübeck and Travemunde and five rural communes; area, 115 sq. m.; pop. (1900) 96.775. The country is fertile, well wooded, and produces rye, wheat, barley, potatoes, oats, hay, and large quantities of fruit. The state is governed by a senate com-posed of 14 life members and a council of 120 citizens. Lübeck is represented in the Reichstag by one delegate. (2.) Free city, one of the three remaining Hanse towns, on the Trave, 10 m. from its mouth, and 39 m. N.E. of Hamburg. Opposite the railway station, on the main approach to the city, is the famous Holsten-thor, a 15th-century brick-built gateway, renovated in 1870. Of its numerous churches the Marien-kirche, founded in 1170, contains valuable works of art. Its dome, enlarged during the 13th century, has an altar painting by Hans Memling. The town hall (1250) is built of black glazed bricks in the style of the Renaissance period. Lübeck joined the Customs Union in 1868. The Lübeck-Segeberg railway is nearing completion, and will be open for traffic in 1907. The principal trade is with Denmark, Sweden, Russia, and Finland, chiefly in machinery, chemicals, preserved food, linen goods, and cigars. In 1904 the imports were valued at £16,465,000, and the total exports at £16,730,000. Founded in 1140, Lübeck was ceded to the dukes of Saxony in 1158, and captured by the Danes in 1201.

After their expulsion it was made a free imperial city (1226), and became the leader of the Hanseatic league (1241). Annexed by France (1810), it once more regained its liberty in 1813, after the battle of Leipzig. In 1866 it joined the North German Confederation, and in 1870 became one of the states of the new empire. Pop. (1895) 69,874; (1900) 82,998.

Lublin. (1.) Government of Poland, W. Russia, occupying the S.E. angle of same. The Vistula Bug on the E., and the Wieprz crosses it. Of the surface, almost one-third is forest, less than a twelfth is pasture land, and most of the rest is arable. crops: rye, wheat, oats, potatoes; of less importance are hemp, flax, beetroot. The chief industries beetroot. The chief industries are distilling and sugar-making; then come flourmilling, brewing, tanning, sawmilling, and furni-ture-making. Chief exports: grain, wool, wood. The Vistula is the chief waterway. Area is the chief waterway. Area, 6,501 sq. m. Pop. (1897) 1,159,463.

(2.) City, Poland, W. Russia, cap. of above gov., 100 m. s.e. of Warsaw, on the Bistrayca or Bistritse, a tributary of the Wieprz (Victule hein). Amount the incompany of the chief water the control of the chief water water the control of the chief water (Vistula basin). Amongst the interesting edifices are a 13th-century cathedral and the old palace of John Sobieski. It has considerable trade, especially in corn, wine, and linen cloth. Distilleries, breweries, tanneries, brickworks, soap, tobacco, and candle manufactures, and flour mills are the main industries. Pop. (1897) 50,152.

Lubni, tn., Poltava gov., S.W. Russia, 75 m. w.N.w. of Poltava city, cap. of dist., on the r. bk. of the Sula, a tributary of the Dnieper. Pop. (1897) 19,108.

Lubricants and Lubricators are materials that are introduced between moving surfaces, in order to reduce the friction between them, and to prevent them be-coming hot. Lubricants are of very varied nature, differing according to the nature of the surfaces in contact, and the speed, pressure, and temperature at which the motion takes place. They may be either solid, semisolid, or liquid—the first-named, such as graphite or French chalk, acting chiefly by filling up the roughnesses of the surfaces in contact, and coating them with soft and slippery material. They have only a limited application, and are chiefly used for wood and rough iron bearings. Liquid and semi-solid lubricants are of far greater importance, and vary from limpid oils to stiff greases, being almost invariably either hydrocarbon oils, of min-eral origin and of high boiling point; vegetable or animal fatty oils, such as olive, rape, castor, lard, and sperm oils; or mixtures of the two, often thickened or 'solidified' with soaps and other



Fig. 1.

substances. These lubricants act principally by converting, to a greater or less extent, the sliding or rolling friction between the parts into the much smaller fluid friction between the particles of the liquid. They should, there-

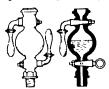


Fig. 2.

fore, have sufficient viscosity to prevent them being squeezed out by the pressure, though not so much as to hinder the motion. A lubricant should not be volatile, or decomposed by heat, or congeal with cold; the former



Fig. 3.

quality being especially important in those oils used to lubricate the interior of cylinders of engines, particularly gas-engines, in which the temperature is very high. Heavy hydrocarbon oils are best for this purpose.



Fig. 4.

It is also important that a lubricant should not be oxidized by exposure to the atmosphere, and thus clog or 'gum;' neither should it be acid, so as to act upon the metal of the bearings, and in this respect the hydrocarbons are better than most other oils. Finally, it should not be readily inflammable, and should be able to carry off any heat generated by what friction there is. This latter and many of the former conditions are greatly assisted by systems of forced lubrication, by which the lubricant is continuously supplied to the bearing under pressure. Semi-solid lubricants of the nature of 'solidified' oils, hydrocarbons such as vaseline and the like, are also applied in this way, and prove very effective with heavy machinery.

Lubricators are the mechanical contrivances used to ensure a constant supply of the oil or other lubricant to rubbing sur-There are several wellfaces. defined forms of lubricators, the most important of which are here given. Fig. 1 shows a siphon lubricator, one of the commonest forms for simple bearings. The oil is siphoned out of the cup, down the centre hole leading to the bearing, by means of a wick, which should first be well soaked in oil. The end of the wick should hang lower than the bottom of the cup; the supply of oil is regulated by the amount of wick used. When the machine is stopped, the wick should be lifted out to prevent the oil being wasted. Fig. 2 shows a simple form of cup lubricator, used to supply oil to a vessel under pressure, as the steam-chest or cylinder of an engine. The lower cock being closed, the cup is filled with oil, and on closing the upper cock and opening the lower the oil runs into the cylinder. Fig. 3 shows the Stauffer lubricator, in which semi-solid grease is used as a lubricant. The cap of the lubricator is filled with the grease, and then on screwing it down the grease is forced along the pipe to the bearing. In practice, an occasional turn of the cap is all that is necessary. Fig. 4 shows a needle lubricator, a type much used for shafting. It consists of a reservoir, usually of glass, having a hole at the bottom through which a wire needle passes, the needle being an easy fit in the hole, and the bottom end resting on the shaft. When the shaft is stationary, capillary attraction prevents the flow of oil past the needle; but when the shaft is in motion, the vibration of the needle allows a small amount of oil to pass. For passing oil into the steam-pipe or valve-chest of a steam-engine. a sight-feed lubricator is often used. In this form of lubricator steam is condensed in a small coil provided for the purpose,



Royalist soldiers searching for fugitives of the army of Prince Charles Edward.
(By permission of Mears. Frod and Need of Bristol, Cition, and London.)

and displaces the oil drop by drop. The oil passes up through a glass tube on its way to the steam-pipe or steam-chest, so that the amount supplied can be observed. A small valve is provided for adjusting the amount. If a bearing is to carry a very heavy load, a force-pump is used to force oil into the bearings. Sometimes a very heavy vertical shaft is water-borne or oil-borne. In the case of dynamo bearings, lubrication is generally effected by a loose ring which lies on the journal and also dips into an oil cistern. See Archbutt and Deelev's Lubrication and Lubricants (1900), and Hurst's Lubricating Oils, Fats, and Greases (1893; 2nd ed. 1902).

Luca della Robbia. See

Lucan, GEORGE CHARLES BINGHAM, EARE OF (1800-88), English field-marshal, was born in London, and entered the army (1816). In command of the cavalry in the early part of the Crimean war, it fell to him at Balaklava to carry out the order which resulted in the disaster to the Light Brigade. Blamed by Lord Raglan, he was recalled, but was not generally held to be responsible for the blunder. He published English Cavalry in the Army of the East (1856). See Kinglake's The Invasion of the Crimea (1863-87).

Lucan, Marcus Annæus Lucanus (39-65 a.d.), the chief Roman poet of the 'silver age,' a native of Corduba in Spain; was educated at Rome under the Stoic Cornutus, and acquired a reputation at an early age. Nero made him questor-a distinction which gave him a seat in the senate. Unfortunately Nero himself claimed to be a literary genius, and found a rival in Lucan. At a public contest the two competed, and the prize was awarded to Lucan. This aroused Nero's jealousy, and he forbade Lucan to publish or recite poems. In his resentinent Lucan joined Piso's conspiracy against Nero (65 a.d.), and when the plot was detected he was put to death. He plate and the prize was detected he was put to death. It tells the story of the civil war between Casar and Pompey, but is unfinished. The best editions are by Weber (1821-31), Haskins (1887), and Hosius (1882).

Lucania, a mail steamer of the Cunard Line, built in 1893. She is 610 ft. long, of 12,950 tons gross, of 30,000 indicated horse power, and of 22 knots speed.

Lucania, div. of ancient Italy, bounded on the N. by the riv. Silarus, separating it from Campania; on the E. by Apulia and the Gulf of Tarentum; and on the s. by the river Laus, which

separated it from Bruttium. The Lucanians were of Samnite race, and were subdued by the Romans in 272 B.C. See Mommsen's History of Rome.

Lucaris, CYRIL (c. 1572-1638), Greek prelate and theologian, native of Crete, imbibed in Switzerland many of the Protestant doctrines, which he strove to introduce during his patriarchate at Alexandria, and subsequently at Constantinople, whither he went in 1621. These efforts led to his banishment to Rhodes and Tenedos successively, and ultimately to his sudden and violent removal from Constantinople, when he is believed to have been strangled. See Life by Pichler (1862).

Lucas, John Seymour (1849), English historical and portrait painter, born in London, trained at the Royal Academy schools, was elected A.R.A. (1886), and R.A. (1898). Among his best works are The Armada in Sight (1880), a vigorous representation of Drake finishing his game of bowls on Plymouth Hoe; William the Conqueror Granting the First Charter to the City of London (1898), a fresco in the Royal Exchange; After Culloden (1884), purchased by the Royal Academy; Flirtation, in the Guildhall Gallery. In 1901 Mr. Lucas was commissioned by King Edward VII. to paint the reception of the Moorish embassy.

Lucas van Leyden (1494-1533), Dutch painter and engraver, was the chief rival of his contemporary, Albrecht Dürer. Displaying his gifts at a very early age, he had at sixteen produced a number of engravings, including a famous Ecce Homo. Among his paintings the best examples are The Last Judgment, at Leyden; Christ Healing the Blind Man of Jericho, at St. Petersburg; and The Card Party, at Wilton House, England.

Lucban, tn., prov. Tayabas, Luzon, Philippines, 8 m. N.w. of Tayabas; manufactures straw hats and mats. Pop. 12,800.

Lucca, tn., cap. prov. Lucca, Tuscany, Italy, on riv. Serchio, 13 m. N.E. of Pisa. Its cathedral of San Martino (11th century) is rich in paintings and sculpture. Many of its churches are built of Carrara marble, and are fine examples of mediæval The ducal palace architecture. possesses a fine picture gallery. The town has extensive silk mills; jute, velvets, tobacco, and cottons are also manufactured. Lucea has been the seat of an archbishop since 1726. Its history dates from 177 B.C., when it was taken by the Romans. In the 12th century A.D. it became a free town. In 1799 it was taken by the French, and in 1805 was erected into a

principality by Napoleon 1. for his sister, Prince's Bacciochi. In 1847 the duchy of Lucca was united to Tuscany, and in 1860 it was annexed to the kingdom of Italy. In the valley of the Serchio R. are the famous baths of Lucca. Pop. (1901) 74,971.

Lucena, city, prov. Cordova, Spain, 37 m. s.s.e. of Cordova; manufactures textiles, bronzes, and earthenware. Red wines and brandy are also produced; and a famous breed of horses is reared in the neighbourhood. Pop. (1900) 21,300.

Lucera, tn., prov. Foggia, S. Italy, 12 m. w.N.w. of Foggia; has a cathedral (14th century), formerly a Saracenic mosque, and a castle of Frederick II. Trade in silk. Pop. (1901) 17,515.

Lucerne (grass). See Alfalfa. Lucerne (Ger. Luzern). (1.) Swiss canton, ranking after Zurich and Bern, and admitted into the Swiss confederation (1332). Area, 580 sq. m. Pop. (1900) 146,474, mainly Germanspeaking Roman Catholics. (2.) Town, cap, of above canton, picturesquely built on both banks of the Reuss as it issues from the lake. It is now the chief centre of foreign tourists in summer, and is on the main line of the St. Gothard Ry. To the E. rises the celebrated viewpoint of the Rigi, and to the s.w. that of Pilatus. The main features of interest in the town are mediceval towers and walls, the bridges (five) including the covered wooden bridge, with its paintings representing scenes from the lives of patron saints, and a 'Dance of Death;' the and a 'Dance of Death;' the Quai National and the Schweizerhof Quai, the latter with a fine avenue of chestnut trees; the Hofkirche, erected in 1506; the town hall, containing antiquarian and art collections; and the 'Lion of Lucerne,' a rock monument modelled by Thorwaldsen commemorating the heroic defence of Louis XVI.'s Swiss Guards during the attack on the Tuilcries (Aug. 10, 1792). An inscription beneath records the names of the twentyone officers. The glacier garden exhibits remarkable pot holes. Pop. (1901) 29,633. (3.) LAKE Pop. (1901) 29,633. (3.) LAKE (Lake of the Four Forest Cantons'), one of the most beautiful of European lakes, bordered by the cantons of Schwyz, Uri, Unter-walden, and Lucerne. Roughly cruciform in shape, it covers an area of 441 sq. m.; has a length of about 23 m., and a depth of 700 ft.; its alt. is 1,434 ft. The lake is subject to sudden and violent storms. Its shores are associated with the authentic and legendary history of the Swiss Confedera-tion. The Rütli and Tell's Platte are inseparably linked with the fame of William Tell.

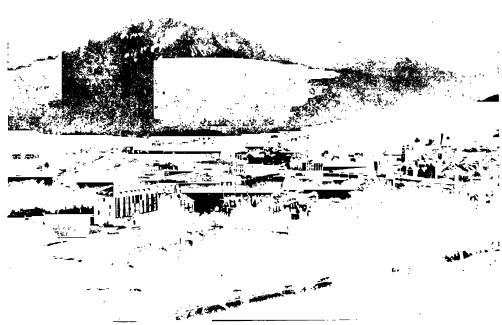
Lu-chu, See Loo-CHOO.

Lucian (c. 120-190 A.D.), the greatest Greek writer of the Christian era, was a native of Samosata on the Euphrates. Lucian was first apprenticed to his uncle, a sculptor, but abandoned this art for literature. He became known as a rhetorician, and travelled to Greece and Italy, and even to Gaul, where he was for a short time a professor of rhetoric. By 160 A.D. he was in Antioch, but removed to Athens, where he found the best appreciation of his work. The majority of his writings were produced between 160 and 180 A.D. The works attributed to Lucian number eighty-three; the genuineness of

The best editions of his works are those of Dindorf (1858), Jacobitz (1874), and Sommerbrodt (1886-93). There is an English translation by Franklin (1781), which is nearly complete; a complete translation (Athens, 1895); also one by Irwin (1894) of six dialogues, one by Campbell Davidson (1902) of several others, and a translation of his works by H. W. and F. G. Fowler (1905). See also Collins's Lucian (in Ancient Classics Scrics, 1873), Croiset's La Vie et les Œuvres de Lucien (1882), Mahaffy's History of Clussical Greek Literature (1880), and Hime's Lucian the Syrian Satirist (1900).

in Isaiah, Tertullian, Gregory the Great, and other fathers regard the name as applying to Satan.

Lucigen Lamp. See LAMPS.
Lucillus, GAIUS (148-103 B.C.),
born at Suessa, was the founder
of the Roman school of satirical
poetry, represented in later centuries by Horace, Persius, and
Juvenal. He wrote with extreme
rapidity and carelessness; but his
vigour, his wit, and his imagery at
once made him one of the first of
Latin poets. Of his works some
eight hundred fragments remain.
Cicero, Horace, and Quintilian
are the chief ancient authorities
on his life. See also Mommsen's
Hist. of Rome and Mackail's



Lucerne and Mount Pilatus.

but forty-eight of these has never been assailed, and perhaps about twenty are undeniably spurious. The Hermotimus attains to fifty-seven octavo pages, but many of his other works are only a few pages long. It is as a satirist that he has won immortality. Perhaps his most characteristic works are those which deal with the next world, the Dialogues of the Dead, the Necoymanteia, and others; those which satirize the gods, the Tragic Zeus, the Icaromenippus, and others; but his Vera Historia has had more influence on modern literature, having inspired Rabelais, Swift, and Voltaire.

Lucifer. (1.) Is properly the Latin name of the planet Venus when it appears as a morning star; it corresponds to the Greek Phosphorus. As the evening star, it is called Vesper or Hesperus. (2.) In mythology, Lucifer was represented as a son of Astræus or Cephalus and Aurora (the dawn). (3.) The name is used in the A.V. of the Bible to translate the Heb. hêlēl, 'shining one,' R.V. 'day star,' in Isa. 14:12, and is there applied to the king of Babylon (or Assyria). Owing to a false comparison of Luke 10:18 ('I beheld Satan as lightning fall from heaven') with the passage

Latin Literature (1895). The best editions of the fragments are those of Müller (1872) and Lachmann (1876). Müller also published Leben und Werke des Lucilius (1876).

Lucina, in Roman mythology the goddess of light, or rather the goddess who brings to light, presiding over the birth of children. Both Juno and Diana had the surname of Lucina. She corresponds to the Greek Ilithyia. Lücke, GOTTFRIED CHRISTIAN

Lücke, GOTTFRIED CHRISTIAN FRIEDRICH (1791-1855), German Biblical excepte, was born near Magdeburg. He was called to the chair of theology at Bonn

(1818), and to Göttingen (1827). His great work is his Grundriss der N.T. Hermeneutik (1817), which, while fixing the scientific principles of exegesis, demands as equally necessary the presence of the religious sense. He exemplified his theories in his Kommentar über die Schriften des Evangelisten Johannes (1820-25; partly trans. by Repp in the Bib. Cabinet), and also wrote an introduction to the Offenbarung des Johannes (1832). See Sander's Biographie (1890), and Schleier-macher in Studien und Kritiken

Luckenwalde, tn., prov. Brandenburg, Prussia, on the Nuthe, 30 m. s.s.w. of Berlin, has woollen manufactures, machine shops, brick fields, and iron foundries. Pop. (1900) 20,986.

Lucknow, chief tn. of dist. of same name, and cap. of prov. of Oudh, is a cantonment and mu-nicipality on the Gumti, 610 m. N.w. of Calcutta. The river forms a waterway to the E. coast. Lucknow is picturesquely situated. Its chief architectural features are the fort, the Imambara, or mau-soleum of Asaf-ud-Daulá, and the Jama Masjid. The manufacture of muslins and shawls, gold and silver embroidery, glass, and pottery ware are its principal indus-tries. Lucknow is an important educational centre, having, besides the Canning and Martinière Colleges, numerous missionary schools. Pathetic interest is attached to the ruined residency. with its cross and graveyard in memory of those who perished in its gallant defence against the mutineers in 1857. Pop. (1901) 264,049. See Innes's Lucknow and Oude in the Mutiny (1895). Lucon. tn., dep. Vendée,

Lucon, tn., dep. Vendée, France, 19 m. S.E. of La Roche-sur-Yon, on canal of Lucon. Seat of a bishop since 1317. Manufactures liqueurs, and has copper and iron founding. Pop. (1901)

6,757.

Lucretia, the wife of Lucius Tarquinius Collatinus. It is said that when the Romans were engaged in the siege of Gabii, Lucius Tarquinius and other nobles vied with each other in praising the virtue of their wives. To test virtue of their wives. which best deserved their praise, they returned suddenly to Rome, and found Lucretia alone, duly engaged in her household tasks. Soon afterwards her husband's cousin, the infamous Sextus Tarquinius, forced his way into her house at night and outraged Lu-cretia. Next morning she sum-moned her husband and father, and after telling her sorrow she stabled herself to death (509 B.C.). The tale is told by Livy and Ovid. See Shakespeare's Rape of Lucrece.

Lucretius (c. 98-55 B.C.), Roman poet, whose full name was Titus

Lucretius Carus. Practically nothing is known of his lite. His great work, De Rerum Natura, a poem in six books, amounting to upwards of 7,400 hexameters, is an exposition of the philosophy of Epicurus, in which he believed. It is Lucretius's first object, as it was that of Epicurus, to free mankind from the fear of the supernatural, of death and the life hereafter. The world arose from the fortuitous concourse of atoms moving through Gods indeed existed, but they did not interfere with human concerns. Thus all phenomena were material in origin, and death simply meant the resolution of the body into its component atoms. This philosophy Lucretius expounds with extraordinary clearness, force, and dignity; yet the best parts of his poem, to modern readers, are his digressions—as, for example, on the fear of death, the origin of the world, the development of society, and the description of the plague of Athens. Of all Latin poets, Lucretius best represents Roman dignity. best editions are those of Lachmann (1866), Munro (with explanatory notes, 1891-3), and Brieger (1894); bks. i. to iii., Lee (1882); bk. v., Duff (1888). Eng. trans., verse, Creech (1682); prose, Munro (1872) (1873). See Malloch's Lucretius (Ancient Classics, 1878), Masson's Atomic Theory of Lucretius (1884), and Mackail's Latin Literature (1895).

Lucrinus Lacus, the Lucrine lake, was really only the inner part of the Bay of Cumæ (Sinus Cumanus), off the coast of Campania, in ancient Italy; but at an early date it was separated from the rest of the bay by a dike about a mile long. It was famous for its oyster beds. Agrippa, the minister of Augustus, made a passage from the lake of Avernus into the Lucrine lake, and from that into the sea, thus constructing the great Julian harbour. In 1538 A.D. the Lucrine lake was filled up by a volcanic eruption, a conical hill, the Monte Nuovo, being formed on its site. See Grässe's Orbis Latinus (1861).

Luculia, a genus of evergreen shrubs, order Rubiaceæ. The two species are L. gratissima, a native of the Himalayas, which bears terminal, many-flowered cymes of rose-coloured flowers; and L. pinceana, a native of the Khasia mountains, with large white flowers. They like a light, peaty soil, with plenty of root room.

Lucullus, Lucius Licinius (c. 110 B.C. to 57 B.C.), famous Roman general, belonged to a plebeian family; first distinguished himself in the Social war, and then accompanied Sulla to Asia as his quæstor in the war against Mithridates, in which he did good

service, remaining in Asia until 80 B.C. In 77 B.C. he was prætor, and afterwards governed Africa with justice and success. In 74 he became consul, and in the campaigns of 74, 73, and 72 destroyed Mitnridates's forces, conquered his kingdom of Pontus, and drove the king himself to take refuge in Armenia. In 69 war broke out with Armenia, as Lucullus required Tigranes, the Armenian king, to surrender Mithridates; and in that year he gained a brilliant victory over Tigranes. In 68 he advanced far into Armenia, but next year had to re-treat. He was then superseded by Pompey. After his return to Rome, Lucullus took little part in politics, but lived a life of luxury. Plutarch has left a Life of Lucullus. See also Mommeen's

History of Rome.

Lucy, HENRY W. (1845), 'Toby, M.P.,' of Punch, was born near Liverpool. He joined the staff of the Pall Mall Gazette (1870) and the Daily News (1873), being the chief of the gallery staff on the latter paper, at the same time writing 'Under the Clock' for the World -a column afterwards transferred to the Daily Telegraph. On the death of Tom Taylor, in 1880, he took up the writing of 'The Essence of Parliament' for Punch, which, under the title of 'The Diary of Toby, M.P., is still one of the brightest articles in the weekly press. He has written diaries of the various Parliaments since 1880, and various other works, including Faces and Places (1895); Mr. Gladstone: a Study from Life (1896); Peeps at Parliament (1903); and Later Peeps at Parliament (1905).

Luddite Riots were the outbreaks in which the popular discontent expressed itself in the Midlands about 1811-18. General distress being caused by the progress of the industrial revolution, the anger of the rioters was directed against the new machinery, much of which was destroyed The name was derived from Ned Lud, a Leicestershire imbecile, who, in a fit of passion, demol-ished two stocking-frames. See Pellew's Life of Lord Sidmouth (1847), and Peel's Risings of the Luddites, Chartists, and Plug-drawers (2nd ed. 1888). Lüdenscheid, tn., Westphalia, Paussia 10 w s of Bayran

Prussia, 19 m. s.r. of Barmen. Manufactures cutlery, musical instruments, hardware, machinery, and cotton; has also iron foundries. Pop. (1900) 25,520.

Lüderitz Bay. See ANGRA PEQUENA.

Ludhiana, cap. of Ludhiana dist., Jalundhar div., Punjab, India, 73 m. N.W. of Ambala; was founded in 1480 by the Delhi princes of the Lodhi family. It has trade in grain, and manufactures shawls, cloths, turbans of Rampur wool. The shrine of Abdul-Kadir-i-Jalani attracts many pilgrims. Pop. (1901) 48,600. The district has an area of 1,375 sq. pilgrims, Pop. (1901) 48,600. m., and a population (1901) of 673,000.

Ludington, city and co. seat and summer resort, Mason co., Michigan, U.S.A., on Lake Michigan, at the mouth of Marquette R., 105 m. N.W. of Grand Rapids; possesses an excellent harbour; has trade in lumber, grain, and truit. Pop. (1900) 7,166.

Ludinovsk, tn., Kaluga gov., Central Russia, on a branch of the Orel-Smolensk railway, 27 m. N.E. of Jukovkay. Has locomotive, carriage-building, iron, and glass industries, 1755, Pop. (1897) Founded in

55. Pop. (1897) 12,000. Ludlow, munic. bor., Shropshire, England, 12 m. n. of Leominster, at the confluence of the Corve and Teme. St. Lawrence Church is ancient, and one of the old town gateways still stands. The castle, founded soon after the conquest, was an occasional royal residence. Here Butler wrote Hudibras, and here Milton's Comus was first performed (1634).

Pop. (1901) 6,328.

Ludlow, EDMUND (1617-93), English soldier and republican, was born at Maiden Bradley, Returned to Parlia-Wiltshire. Returned to Parliament by Wiltshire in 1645, he was partly responsible for 'Pride's Purge; he sat as one of the king's judges, and signed his deathwarrant. In 1651 2 he did much towards the subjugation of Ireland; but disagreement with Cromwell led to his retirement from public life until the protector's death. Re-entering Par-liament (1659), he was impeached for treason in 1660, and forced to flee to Vevey, where he died. His valuable *Memoirs* were published at Vevey (1698-9; ed. C. H. Firth, 1894). See also Guizot's Firth, 1894). See also Guizot's Portraits Politiques (1852; trans. by Scoble as Monk's Contemporaries, 1851).

Ludwig, or Louis. The German emperors of this name are: - Louis 1. (778-840), le Débonnaire,' son of Charlemagne, whom he succeeded as emperor in 814, but was deposed by his sons. but was deposed by ms sons. Louis II. (c. 822-875), son of Lothaire I.; became associated with his father in 849, and succeeded to the imperial crown in 855.—Louis III. (c. 880 929), 'the Blind, grandson of Louis II.; became emperor in 901, but, owing to his infirmity, was only nominal ruler.—Louis iv. (893-911), 'l'Enfant,' last of the Carlovingians; succeeded his father, Arnulph, in 900. He was defeated hy the Hungarians (907-910),— Louis v. (c. 1287-1317), 'the Ba-varian;' was elected emperor 1314), quarrelled with Pope Benedict XII., and was excommunicated for denying papal authority in Germany. He was thority in Germany. He was opposed by Clement VI., who promoted the election of Charles

of Moravia as emperor in 1346. Ludwig I. (1786-1868), king of Bavaria, son of King Maximilian Joseph, whom he succeeded (1825). He supported the Greek struggle for independence (1826), erected the Walhalla in Munich (1830), and abdicated on his refusal to grant political reforms (1848).

Ludwig II., OTTO FRIEDRICH WILHELM (1845-86), grandson of the preceding, succeeded his father, Maximilian II. (1864); op-posed Prussia in the war of 1866, but joined the German empire (1870). As ruler of the chief German state, he had the honour of inviting the king of Prussia to become German emperor. He was a vigorous opponent of the Ultramontanes, against whom he gave a strong support to his Liberal ministers. An extraordinary passion for building palaces on a huge and expensive scale induced an inquiry to be made as to his mental condition, and he was declared insane. Shortly afterwards he drowned himself in a neighbouring lake. Ludwig was the lifelong friend and supporter of Richard Wagner, on whom he

showered gifts and honours.

Ludwig, KARL FRIEDRICH
WILHELM (1816 95), German physiologist, born at Witzenhausen,
Hesse; became professor of annatomy and physiology at Zürich (1849), at Vienna (1855), and of physiology at Leipzig (1865-95). Ludwig was one of the most celebrated of modern physiologists, and expressed many original ideas on the subject in his Lehrbuch der Physiologic des Menschen (1852 56). Under his guidance the Physiological Institute at Leipzig became a centre of original scientific research second to none. He was the inventor of the mercurial

blood-pump.

Ludwig, Otro (1813-65), German dramatist, born at Eisfeld, Saxe-Meiningen. His first work, Der Erbförster, appeared in 1853. This was followed by Die Makkabder (1855). One other notable work, a tale, Zwischen Himmel und Erde (1857), was all that he lived to finish and publish, though there appeared after his death Shakespeare-Studien (1871). His Gesammelte Schriften were published in 1891-2, and again in 1900 by Adolf Bartels.

Ludwigsburg, tn., Wurtemburg, Germany, 10 m. N. of Stuttgart; is the principal military depot of Wurtemburg. Has cannon foundry and arsenal; manufactures metallic wares, musical instruments, chemicals, cotton and woollen goods. Pop. (1900) 19,436.

Ludwig's Canal, canal, Bavaria, Germany, from Dietfurt on the Altmühl to Bamberg on the Regnitz, connecting the basins of the Danube and the Rhine.

Ludwigshafen, tn. in the Rhine palatinate, Bavaria, Germany, on the l. bk. of the Rhine, opposite Mannheim; has impor-tant manufactures of aniline dyes and soda, and does considerable trade in timber, iron, and coal. The chemical works are said to be the largest in the world. Pop. (1901) 61,900.

Luff, the order to the helmsman to put the tiller towards the lee side of a ship, in order to make her sail nearer to the direc-

tion of the wind.

Lugano, largest tn. of the Swiss canton of Ticino, on the N. shore of Lake Lugano (213 m. long). Though politically Swiss, Lugano is Italian in every other respect. It is much frequented by visitors in spring and in autumn. Pop. (1900) 9,500.

Lugansk, or Lugan, tn., Ekaterinoslav gov., S. Russia, 16 m. s.e. of Slavyanoserbsk, at the junction of the Olkhovaya and Lugan. It has an important trade in grain, cattle, copper, and wool. There are iron and coal mines near. The industrial establishments include iron foundries, blast-furnaces, cannon foundries, and engine shops. Pop. (1897) 20,-19.

Luganskaya Stanitsa, taship. of Don Cossacks, in territory of the Army of the Don, S. Russia, 45 m. N.W. of Kamenskaya Stanitsa, on the Donets. Pop. (1897)

20,381.

Lugard, Sir Frederick John DEALTRY (1858), African traveller and administrator, has seen active service in Afghanistan, Burma, the Sudan, and Uganda. He made terms with King Mwango when acting for the British E. Africa Company, and established imperial interests in remote parts of W. Africa. He was commandant of the W. African Frontier Force, which he raised (1897-9), and since 1900 has been high commissioner of N. Nigeria, with the rank of brigadier-general.

Lugdunum. See Lyons. Lugdunum Batavorum. LEYDEN.

Lugger, a small vessel having one, two, or three masts, upon each of which is set a square 'lugsail.' She may also carry topsails, and have a howsprit on which are set one or more jibs. The lugsails of a lugger hang obliquely to the masts, their yards being slung at onethird of their length. Luggers sail close to the wind, and par-Luggers ticularly well when close-hauled.

Lugo. (1.) Province, Galicia, N.W. Spain, an extremely mountainous district watered by the Minho, with a coast-line on Bay

of Biscay. The slopes of ranges or produce cattle and timber; the valleys abound in agricultural supplies and fibres. There are mines of copper and lead, and quarries of slate, granite, and marble. The province contains sixty-four townships, and its area is 3,814 sq. m. Pop. (1900)



(2.) City (anc. Lucus 465.38J. Augusti), cap. of above prov., on riv. Minho. There are many curious Roman remains, including the thermae, still much frequented in summer. Pop. (1900) 28,024. (3.) Town, Central Italy, prov. Ravenna, 17 m. w. of town of that name. Important annual fair (Sept.). Manufactures rope

and furniture. Pop. (1901) 27,415. Lugos, chief tn. of co. Krasso-Szöreny, S. Hungary, and an episc. see of the Greek Catholic Church, 37 m. E. by S. of Temesvar. Good

wine is made. Pop. (1900) 16,100. Lug Sail. See SAIL AND RIG-GING.

Lug-worm, or Lob-worm (Arcnicola piscatorum), a marine annelid or segmented worm which is greatly prized as food by many ground-feeding fish, and is in con-sequence valued as bait. It is a burrowing worm, going down to a depth of about two feet, and occurs in vast numbers on muddy shores between and beyond tide-marks. The food consists of organic particles mingled with the muddy sand, and the indigestible residue is thrown up at the surface in the shape of the familiar worm 'castings.' The animal is



Lug-worm,

cylindrical in shape, the anterior region being thickest, and some-times reaches a foot in length. With the dark brown or green tint of the body the bright red gills contrast strongly. They number thirteen pairs, and are branched and treelike.

Luik, Belgium. See Liege.

Luines, Duc de. See Luynes. Luini, Bernardino (c. 1470c. 1535), Italian pai ter of the Lombard school, was born at Luino, on the Lago Maggiore. His work shows in a marked degree the influence of Leonardo da Vinci, to whom much of it was formerly ascribed. Many of his works are to be found in the churches and galleries of Milan, Saronno, and Lugano. He is one of the five painters for whom Ruskin claims supremacy' his Modern Painters. Williamson's Bernardino Luini (1899).

Luino, or Luvino, tn., prov. Como, Lombardy, Italy, on the E. shore of Lake Maggiore, 22 m. N.W. of Como; has cotton-weaving Pop. (1901) and silk-spinning.

5,890.

Luise, Auguste Wilhelmine Amalie (1776–1810), queen of Prussia, daughter of Karl, Duke of Mecklenburg - Strelitz, was born at Hanover (1776), and married the prince-royal of Prussia, afterwards Frederick William III., in 1793. She particularly distinguished herself by her resolute conduct during the Napole-onic campaign, and the Prussian order of Luise was instituted in her honour. See Hudson's Life and Times of Louisa, Queen of Prussia (1874), and Lives, in German, by Lonke (1903) and Brendicke (1904).

Luisia, a genus of tropical epiphytal orchids with dull-coloured flowers. A few of the species are cultivated, mest commonly L. platyglossa, which is characterized by its hairy roots and its somewhat dingy purple

flowers.

Luke, THE GOSPEL ACCORDING TO, the third book in the canen of the New Testament, often called the 'third gospel.' It presents a well-ordered account of the public ministry of Jesus, using both the Mark narrative and the Matthew logia (see Lo-GIA), but with considerable freedom, and employing independent sources for the birth and early years of Christ. (See Gospels.)
The matter peculiar to Luke, both history and parable, is of the highest interest and value. Very ancient trudition identifies the author with Luke, 'the be-leved physician,' the companion of the apostle Paul (Col. 4:14, etc.), and critics are at least agreed that he was one with the writer (or compiler) of the book of Acts. The assonances between the third gospel and Paul are striking—e.q. the use of the term 'justify' (18:14 and other four times; frequent in the epistles); forgiveness through faith (7:36-50); the universality of the gospel (10:25-37, 17:11-19); cf. also

the almost identical phraseology in the account of the last supper (Luke 22:19 f.; 1 Cor. 11:23 f.). Professor W. M. Ramsay ranks Luke as a historian of the highest qualities (St. Paul, etc.), and Renan speaks of the work as 'the most literary of the gespels.' See the commentaries by Meyer (trans.), later German edition by B. and J. Weiss, Godet, Plummer (Internat. Crit. Com.), Holtz-mann (in Hand-Com.), Farrar (Cambridge Bible), Adency (Century Bible).

Lukuja. See Tanganyika. Lulea, seaport and chief tn., co. Norrbotten, Sweden, on isle of Sando, at mouth of Lulea; has trade in Gellivara iron ore, timber, tar, salmon, and reindeer hides. It is connected with Stockholm by a steamship line. Pop. (1901) 9,484.

Luleå, river of N. Sweden, rising in two sources near the lefty Sulitelma (6,200 ft.), and after forming a series of lakes and many imposing waterfalls reaches the Gulf of Bothnia at Lulea. Length.

255 m.

Lull, RAMON (c. 1235-1315), Spanish Christian philosopher, known as 'the enlightened doc-tor,' born in Majorca, spent his life in preaching throughout Europe the truth of the gospel as proved by reason. To him were due the study of Oriental tongues in Oxford, Paris, Bologna, and other seats of learning, and the foundation of the Lullian school of rational Christianity. His principal works are Ars Brevis and Ars Magna. A collected edition of his works was published at Mayence (1721-42).See Helfferich's Raymond Lull (1858), Canalejas's Las Doctrinas del Doctor R. Lullo (1870), and Barber's Raymond Lully (1903).

Lully, GIOVANNI BATTISTA (1633 87), the founder of French GIOVANNI BATTISTA opera, was born at Florence, and taken in boyhood to Paris, where he became a member of the band of Louis XIV., who made him director of music to the royal family (1662), and later director of the Académic Royale de Musique (1672). In conjunction with Quinault, Lully composed numerous operas, and was equally suc-cessful whether writing in a light or in a serious vein. His most important compositions are Al-ceste (1674), Thésée (1675), Persée (1682), and Armide (1686). See Life, in French, by Radet (1891).

Lully, RAYMOND. See LULL, RAMON.

Lumbago (Lat. lumbus, 'loin'). While most believe that lumbago is a rheumatic affection of the lumbar muscles and fascia, many authorities attribute it to rheu-matism of the sacro-iliac ligaments and cartilages. True lumbago is sudden in its onset. The patient, on attempting to rise from a stooping posture, has a sensation of being gripped across the loins, and is at first power-less to move. After a time, and with considerable pain, he can straighten his back, but he then finds himself unable to stoop. Lumbago is seldom accompanied by rise of temperature or by much disturbance of the general health, and at the end of an attack the pain and stiffness may disappear as suddenly as they came. Those who are subject to the condition should wear warm clothing, eat plentifully of good food, and avoid cold and damp. Cod-liver oil is also a prophylactic. During an attack a purge should be taken; and alkalis and aconite are beneficial, with large quantities of hot drinks, such as weak tea, to promote sweating. For this purpose hot-water baths and Turkish baths are also useful. As counter-irritants, mustard plasters and turpentine stupes may be applied to the back. In a severe attack, dry cupping is of service; and recently an old method of treatment has been revived-riz. acupuncture, one or more needles being thrust into the skin over the painful spot. This operation occasionally gives immediate relief, which may last for several hours. In slight attacks belladonna plaster soothes the pain.

Lumbering. The growing, felling, and preparing of wood for building purposes, shipbuilding, furniture manufacture, and a variety of other uses forms one of the most important industries of the United States, Canada, and of some European countries. The industry, especially in America, is well organized, and is subdivided into—(1) logging, which includes the felling, cutting in lengths, and transport-ing to the mill; (2) sawmilling of the logs into rough timber, beams, joists, boards, and lathes; and (3) the planing of these. In the northern states and in Canada lumbering is chiefly carried on in winter, and the logs are transported on sleighs over the icy roads. The chief wood-exporting countries are the United States, Canada, Austria, Norway, Sweden, and Russia; Great Britain and Germany being the largest importers. See For-ESTRY, TIMBER.

Luminescence is the term applied to those cases in which a body gives out light without being hot. There are many varieties of this phenomenon. Thus, it may be set up by chemical action, such as the glow of phosphorus or of the fire-fly; or it may be caused by the action of both visible and invisible light, as in the case of the fluorescence of quinine solutions or the phosphorus are the properties.

phorescence of luminous paint. Electric discharges are also a fruitful source of luminescence, causing it vither by the bombardment of electrified particles, their disintegration, or by the radiations, such as X-rays, set up in the process. Cases of this action are observed in the luminosity of the gases and glass of vacuum tubes, and the fluorescence of screens coated with substances such as barium platinocyanide; whilst the similar effects produced by radium itself, or by the action of radium rays, on these screens, on diamonds, and on zinc blende, are probably ascribable to similar causes. Luminescence is also caused by friction, as when sugar is crushed; by heating, as when fluorspar is dropped on a hot plate; and in other ways.

plate; and in other ways. Luminosity (intrinsic) is the amount of light emitted per unit of area of a shining body. It is due in most cases to the body being hot, an object becoming visible in the dark when between 400° and 500° C., bright red at about 900° C., and white at 1,200° c. approximately. Most of the luminous bodies that owe their light to incandescence are in the solid state. This is obvious in the case of the incandescent gas lamps, in the lime light, and also in the electric arc, from which most of the light is emitted by the glowing ends of the carbon rods, but little coming from the intervenient the intervening carbon vapour. Flames of burning hydrocarbons, as of coal gas or candles, also owe their luminosity to the incandescent solid particles of carbon set free from the com-pounds present; but in other cases, such as that of oxygen and hydrogen burnt under pressure, where solid particles cannot be present, and possibly in the case of burning hydrocarbons also, dense gases play a similar part. (See FLAME.) In comparing luminosities, the eye is not proportionally sensitive to the amount of light emitted. Thus, a sur-face giving out a hundred times as much light as another only appears about five times as bright. This difficulty is overcome by arranging the two sources at such distances as to equally illuminate areas in juxtaposition (equal luminosities being accurately com-parable), when, in accordance with the law of inverse squares, light emitted by the two sources is in proportion to the square of their distances from the illuminated surfaces. Serious difficulties, however, are introduced if the lights are of different tints, and the standards are by no means entirely satisfactory. See

PHOTOMETRY and LUMINESCENCE.

Luminous Paint contains materials that become luminescent

and throw out a feeble glow of different tints for some time after it has been exposed to sunlight, or other light rich in ultra-violet rays. The earliest of these substances was 'Bologna phosphorus,' which consisted of impure barium sulphide, obtained by heating barium sulphate with carbon. Canton's phosphorus, which is calcium sulphide similarly prepared, and the corresponding strontium sulphide, also act in the same way, the effect produced being largely dependent on the presence of traces of other substances, such as manganese or bismuth. Balmain's luminous paint is stated to contain the latter element along with calcium sulphide.

Lumpsucker (Cyclopterus lumpus), a clumsily-built fish, common off the coasts of Scotland, N. Europe generally, and N. America. Its southern limit is the Bay of Biscay. The body is massive, and marked with tubercles and longitudinal ridges; the first dorsal in is buried in a fleshy ridge in the back, while the ventral fins form a powerful sucker; the tail is short, and the

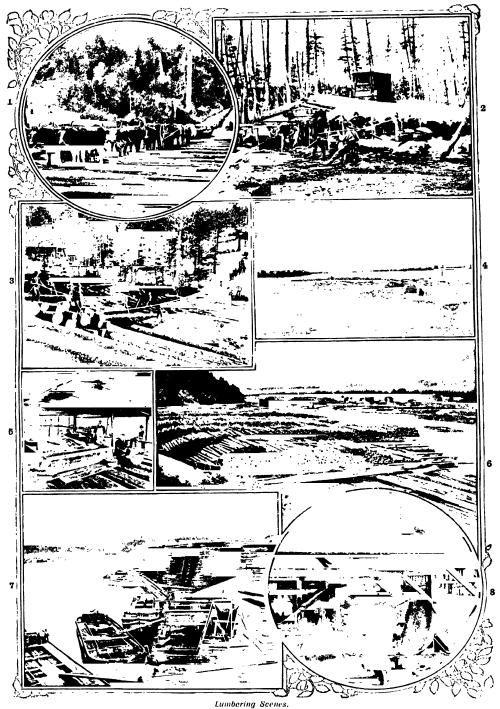


Lumpsucker.

fish is a poor swimmer, but it possesses the power of attaching itself firmly to rocks by means of the sucker. The breeding habits are interesting, for the male watches over the egg mass for several weeks. The lumpsuckers are bony fish, belonging to the family Discoboli.

Lumsden, Sir Harry Bur-NETT (1821-96), British soldier, was quartermaster and interpreter to native troops in Afghanistan (1842); commandant at Peshawar (1849), and was at Kandahar and Kabul during the Indian mutiny (1857-9). A born leader, he raised (1847), organized, and commanded the 'Queen's Own Corps of Guides,' which afterwards became a distinguished Indian regiment. See Lumsden and Elsmio's Lumsden of the Guides (1899).

Lunacy and the Lunacy Laws. 'A lawyer, when speaking of insanity,' says the late Mr. Justice Stephen, 'means conduct of a certain character; a physician means a certain disease, one of the effects of which is to produce such conduct.' A lunatic comes into relation with the law—(1) when he suffers from such unsoundness of mind that it is



1. Timber-hauling on a corduroy read, Camada. 2. A Canadian lumber camp. 3. Straightening out a Jam of logs, Lake Kippewa district.
4. Towing boom of logs to ntill, Canada. 5. Life on a lumber raft, Ottawa R., Photo by Notman.) 6. Timber tarts on the Isar, Bavaria.
7. Lamber barges at Ottawa. (Photo by Notman.) 8. A glant log at Royal City Sawmills, New Westmuster, British Columbia. (Photo by Notman.)

necessary for his own or the public welfare that his liberty be restricted; (2) when he is incapable of managing himself or his affairs, or of directing their management; and (3) when a plea of insanity is entered on his behalf in answer to a criminal charge. The legal view of insanity is thus much more limited than the medical, since it includes only questions of life or property, competency and responsibility, and ability to transact the affairs of According to the law of England, the modern view is that whether a person is or is not a lunatic is in every case a ques-tion of fact. He may suffer from delusions, but be quite capable of making a will. His contracts are good, unless to the knowledge of the other party he was incapable of understanding what he was doing. He is criminally responsible for his actions, unless from defective mental power or from mental disease he cannot understand the nature of his acts, or does not know his act is wrong, or is unable to control his conduct—unless, in the last case, his want of control arises from his own fault.

In England lunatics are governed by the Lunacy Acts, 1900 and 1901. They may be received in (1) houses licensed by the Lunacy Commissioners, if within seven miles of London, and by the justices in quarter sessions clsewhere; (2) hospitals, which are places supported by voluntary contributions, and must be registered by the commissioners; (3) county or borough asylums for pauper lunatics. The coun-cils of all administrative counties and county boroughs, and of certain other boroughs mentioned in the 4th schedule to the Lunacy Act, 1890, are bound to provide asylums for the requirements of their areas. A lunatic may be received into a licensed house for not more than seven days on an urgency order, which is an authority given generally by a relative, and accompanied by a medical certificate authorizing the detention on the ground of ur-gency. But in ordinary cases a reception order is made by a county court judge, stipendiary magistrate, or specially appointed justice, on a petition by a relative of the lunatic, and a certificate by two medical men. A reception order is good for one year from its date, but can be renewed on a medical certificate. Orders for the discharge of a patient may be made by the person who petitioned for his detention, or by a visitor, or by the commissioners, and even a stranger can obtain an order for the special medical examination of a lunatic, with the leave of the commissioners. All lunatic asylums must be constantly visited without notice. The acts contain special provisions as to lunatics in private families, and lunatics kept singly as patients.

as patients.

There are ten commissioners in lunacy, four unpaid and six paid, of whom three are legal and three medical, appointed and removable by the lord chancellor. All lunatic asylums, public and private, are under their supervision

and control.

The judge in lunacy and the masters in lunacy have the widest powers in respect of the management of a lunatic's property, in cases where the lunatic (1) has been so found by inquisition—i.e. where a formal inquiry by a master in lunacy, generally with a jury, has been held into the lunatic's state of mind; (2) is lawfully detained; (3) is incapable of managing his affairs, and this is proved to the judge in lunacy; (4) has less than £2,000 of property, and is proved to be a lunatic. When a person is found a lunatic by inquisition, the judge in lunacy appoints a committee of the person, who is responsible for the lunatic's comfort; and a committee of the estate, who is responsible for the management of his proporty. Criminal lunatics are governed by the Criminal Lunatics Act, 1800, the Criminal Lunatic Asylums Act, 1860, and the Criminal Lunatics Act, 1884. Asylums may, from time to time, be provided for the exclusive use of criminal lunatics. In England. criminal lunatics are detained at Broadmoor; in Ireland, at Dundrum; and in Scotland, at Perth Penitentiary.

In Scotland lunatics are treated under the Lunacy (Scotland) Acts, 1857 and 1887. The procedure as to the reception and detention of lunatics is practically the same as in England. The sheriff is the judicial authority, and an urgent case is received into an asylum upon an emergency certificate, which is valid for only three days. The supreme administrative authority is the Board of Lunacy for Scotland, consisting of one unpaid and two paid commissioners. The office of the board is in Edinburgh. The property of lunatics in Scotland is simply and inexpensively managed by being placed in charge of a curator bonis appointed by the court. In Ireland the lunacy laws are similar to those of England. See also INSANITY, and Archbold's Lunacy (4th ed. 1895), and Wood Renton's Law of and Practice in Lunacy (1889).

Lunardi, VINCENZO (1759-1806), Italian aeronaut, secretary to the Neapolitan embassy, London, was one of the first to make a balloon ascent in England (1784). His balloon was 33 ft. in diameter, and inflated with gas produced from zinc and sulphuric acid. After an eight hours' journey from Moorfields, London, he descended safely near Ware.

Lunaria. See Honesty. Lunawara, or LUNAWADA, cap. of state of same name, in Rewakanta, Gujarat, India, 65 m. E. of Ahmadabad. Pop. 10,000.

Lund, city, co. Malmöhus, Sweden, on the Höjeä. In the middle of the city is the cathedral, the finest Romanesque building in Scandinavia (consecrated 1145); the old university, now the library; the new university, built 1878-82; and the botanic garden. Lund has a few industries—gloves, furniture, and iron-smelting. Here in 1676 Charles XI. defeated the Danes, and at Lund the peace of 1679 was signed. Pop. (1901) 16,900.

Lund, TROELS FREDERICK (1840), Danish historian, historiangrapher royal and professor at the military school of Frederiksberg, has published important works on Scandinavian history, including Historiske Skitser efter utrykte Kilder (1876), and Danmarks og Norges Historie i Slutningen af det 16 Aarhundrede

(1879-91).

Lunda, extensive territory of Central Africa, lying s. of the Congo Free State, between the Kwango in the W. and the Lualaba in the E. It is drained mainly by the Kassai and its l. bk. tributaries. Formerly a Bantu empire, it is now divided between Portuguese W. Africa and the Congo Free State.

Lundenburg, tn., S. Moravia, Austria, on the Thaya, 30 m. s.e. of Brünn. It was formerly the Moravian capital. Pop. 6.776

Moravian capital. Pop. 6,776.
Lundy, small isl. lying off
Barnstaple Bay, N. Devon, England, 11½ m. N.N.W. of Hartland
Point. Pop. about 100. It has
a lighthouse, and possesse ruins
of remarkable towers, attributed
to its De Marisco lords (c. 11001321). Here, on May 30, 1906,
H.M.S. Montagu (first-class
battleship) went ashore and became a total loss.

Lüneburg, tn., Prussian prov. of Hanover, Germany, on the Ilmenau, a tributary of the Elbe; has several historic churches and public buildings dating from the 14th and 15th centuries. Manufactures include chemicals, iron wares, and carpets. Large quantities of gypsum and salt are mined. Pop. (1900) 24,693.

Lunel, tn. in dep. Hérault, S. France, 14 m. E.N.E. of Montpellier; has trade in wines, brandy, and cattle. Pop. (1901) 7,532.

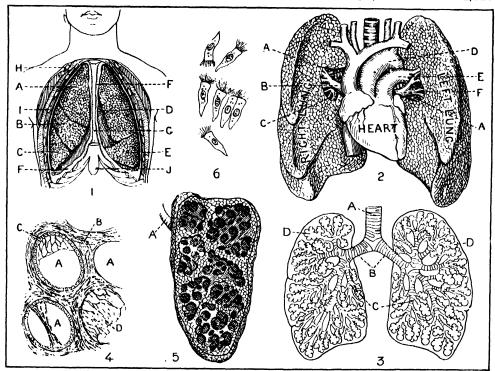
Lunenburg, seapt. in. in s. of Nova Scotia, British N. America, the co. in. of Lunenburg co. Industries are fishing and shipbuilding. Pop. (1901) 2,916. Lunette. (1.) A small vaulted aperture built in a large vaulted roof to admit light, examples being afforded by the upper lights in the nave of St. Paul's Cathedral. (2.) In fortification, a detached work with flanks or lateral wings built for the protection of roads and bridges.

Luneville, tn., dep. Meurthect-Mosolle, France, on Meurthe R., 18 m. s.E. of Nancy. The principal products are faïence, linen, cotton, silk, hosiery, glass, leather, and gloves. The peace of Luneville was signed here in 1801. Pop. (1901) 23,269.

phibians, the original cavity of the outgrowth becomes largely filled up by a spongy network, which greatly increases the surface available for purposes of respiration, and gives to the organ its characteristic appearance. Lungs have apparently originated from the air or swim bladder of a fishlike form, and thus afford an example of an organ which was primitively hydrostatic, and has secondly acquired a respiratory significance. In the Dipnoi the swimbladder is both functionally and structurally a lung, and is more

the thorax, instead of being free as in mammals, and are not capable of great expansion. They are, however, remarkable in communicating with an elaborate system of air-sacs, nine in number, which lie within the body-cavity, and are connected in their turn with other air-spaces within the bones, beneath the skin, and so on. In mammals generally the lungs resemble those of man.

Anatomy.—The lungs are the principal organs of respiration, and are situated in the thoracic cavity. In colour they are pinkish gray mottled with black, and



The Lungs.

Fig. 1. Human thorax, anterior wall removed, showing lungs in position: right lung—A, superior lobe; a, middle lobe; c, inferior lobe; left lung—b, superior lobe; E, inferior lobe; F, F, pleura; c, mediastimun; n, clavicle; 1, riles; J, sternum. Fig. 2. Lungs, spread out; A, A, leshi; B, right pull of the remin; c, right pulmonary artery; p, arch of aorta; r, left pulmonary artery; r, left pulmonary artery; p, left pulmonary arter

Lung-chau, tn., Kwang-si, China, near the Tong-king frontier, opened to trade with the French colony in 1889. Pop. estimated at 20,000.

Lungs. — Comparative. — The lungs are hollow outgrowths from the anterior part of the alimentary tract, the proximal narrow portion of the outgrowth forming the windpipe or trachea. They form the characteristic respiratory organs of the air-breathing yertebrates. Except in some am-

complicated in structure than in a certain of the amphibians. In a few amphibians, indeed, the lungs are entirely absent, the animals breathing by means of the highly vascular mouth-cavity. Thehigher Amphibia, like the reptiles, have well-developed lungs, which in the chameleon among lizards communicate with a series of airseas analogous to those which occur in birds. In birds the lungs are relatively small, and are bound down to the wall of

in shape each is conical, the apex lying in the root of the neck, while the concave base rests upon the disphragm. They communicate with the external air by the trachea or windpipe, which bifurcates to form a right and a left bronchus, each of which divides and subdivides throughout the entire lung. The right lung is the larger and heavier, and is divided into three lobes -upper, middle, and lower. The left lung has only two lobes, and is narrower

than the right on account of the position of the heart, which lies between the two lungs, but in-

clines to the left side.

Externally each lung is covered by a double serous sac, the pleura. The outer surface of the outer layer of the pleura is adherent to the chest wall, and is called the parietal, or some-times the costal layer; while the inner surface of the inner layer is closely adherent to the lung. and is known as the visceral or pulmonary layer. The inner sur-face of the parietal and the outer surface of the visceral layers are smooth and glistening, so that one can glide over the other during the movements of respiration. The interspace between the two layers is called the pleuritic cavity, but in health the two smooth surfaces are separated only by a little serous fluid, which acts as a lubricant.

The bronchi are circular cartilaginous tubes, which by successive subdivisions diminish until their diameter is only about onefortieth of an inch, when they lose their circular form, and terminate in irregular passages, on the sides of which are the small air-sacs known as alveoli. The walls or septa between neighbouring alveoli contain much delicate elastic tissue, and carry the pulmonary capillaries, which are distributed in a very fine network with meshes smaller than the vessels themselves. The blood is thus spread over the alveolar walls in a thin layer, and is separated from the air contained in the alveolus only by the delicate capillary wall and the equally delicate epithelial cells which line the alveolus. All the alveoli communicate directly with the bronchioles, or ultimate divisions of the bronchi.

The blood supply to the lungs is double, one set of vessels, the bronchial, being nutritional, while the pulmonary vessels are concerned with the process of respiration, and are therefore functional, since they circulate through the lungs the blood whose purification is the province of the breathing organs. The bronchial arteries are comparatively small. Springing from the thoracic portion of the aorta they accompany the bronchial tubes, and supply with arterial blood the lung tissue and bronchial glands as well as the bronchi themselves. The pulmonary themselves. themselves. The pulmonary artery is a large vessel which carries impure blood from the right ventricle of the heart. Like the trachea, it bifurcates, and the right and left divisions pass to their respective lungs with the bronchi which they accompany, dividing and subdividing in similar fashion until they terminate in the dense capillary network round the alveoli. The pulmonary blood, after being purified in the alveolar capillaries, returns to the heart by four pulmonary voins. The pulmonary lymphatics are numerous. The pulmonary nerves arise from plexuses, which are chiefly formed by branches from the vagi and from the sympathetic system.

Physiology. - All living cells require oxygen for their nourishment, and for the continuance of life the blood must constantly renew its supply of oxygen, and at the same time part with the carbon dioxide which it has washed out of the tissues. The red cells of the blood are the carriers of oxygen, which unites temporarily with the hamoglobin contained in these cells, and gives arterial blood its characteristic bright red colour, venous blood being dark and purplish. In pulmonary respiration the act of inspiration is effected by enlargement of the thoracic cavity, through the muscular contraction of the diaphragm and the intercostal muscles which stretch from rib to rib. The lungs play a passive part in inspiration. Being practically elastic bags, they follow the retreating chest walls and floor, with the result that air is drawn in through the traches. In the expiration of ordinary breathing, the diaphragm and intercostals being relaxed, the elasticity of the lung causes it to contract, and drives out some of the contained air. In ordinary breathing about 30 cub. in. of tidal air pass in and out of the adult lung at each respiration, but an additional 100 cub, in, of supplemental air can be expelled by forced expiration. There remains about 100 cub. in, of residual air, which no effort can drive out of the lungs. At the end of ordinary inspiration the lungs thus contain about 230 cub. in. of air, to which a further 100 cub. in. of complemental air can be added by a deep-drawn, prolonged inspiration. In ordinary breathing the tidal air is only about oneeighth of the total contained in the lung, the remaining seveneighths being stationary. pired air differs from inspired in being warmer, moister, and in having about 5 per cent. more carbon dioxide and 5 per cent. less oxygen. About 400 cub. ft. of air pass through the lungs of an adult in twenty-four hours, in which time about 9 oz. of water and 8 oz. of carbon in the form of carbon dioxide are exhaled. In ordinary breathing the respiratory act occurs about eighteen times per minute, but exertion and exposure to cold accelerate the breathing, and at the same time hasten the movements of the heart, so that a greater volume of blood is poured through the lungs per minute. The nervous centre for respiration is situated in the medulla oblongata, and appears to be chiefly stimulated by venous blood. Until recently deficiency of oxygen was believed to stimulate the centre, but it is more probable that the active agent is free carbon dioxide in the blood which bathes the nerve cells. When the blood, therefore, is sufficiently charged with carbon dioxide to irritate or stimulate the respiratory nerve cells, or to paralyze controlling cells which inhibit them, impulses are transmitted to the inspiratory muscles, whose contraction replaces the excess of carbon dioxide by a fresh supply of oxygen. Other stimuli, however, act upon the centre; thus cold water dashed upon the chest causes strong involuntary inspiration, and within certain limits both inspiration and expiration are under voluntary

control.

Pathology, - Most of the discases of the respiratory apparatus are described in special articles. (See ASTHMA, BRONCHITIS, CIR-RHOSIS, EMPHYSEMA, PHTHISIS, PLEURISY, PNEUMONIA.) Injuries of the lung are most frequently due to penetrating wounds of bullets or of cutting instruments, but not uncommonly the ragged end of a broken rib lacerates the underlying lung. In all such cases there is risk of air getting into the pleural cavity, either from the wound in the chest wall or from that in the lung. Air in the pleural cavity (pneumothorax) is generally accompanied by a certain amount of fluid. Should the fluid be serous, the condition is known as hydro-ineumothorax, while a mixture of air and pus is called pyo-pneumothorax. grene of the lung is a rare disease, and usually occurs only in the debilitated. Abscess may be primary, and may follow a wound or suppurative disease in a neighbouring organ; thus, an abscess of the liver may perforate the diaphragm and lead to abscess of the lung. More common, however, are multiple abscesses due to such a disease as pyamia. Various circulatory derangements affect the lungs. Active congestion is usually associated with other diseases, such as pneumonia. Passive congestion may be obstructive, and is common in disease of the left side of the heart; or it may be hypostatic, when from general debility the posterior and basal parts of the lungs become engorged with blood and serum. A not uncommon condition, known as pulmonary apoplexy, or hamorrhagic infarct, results from the blocking of a branch of the pulmonary artery

Diseases of the lungs are char-

acterized by four leading symptoms — pain, interference with breathing, rise of temperature, and cough. While pain is present in most pulmonary affections, it varies in severity and in charactor. In bronchitis it may only amount to a raw, burning sensation in the trachea, while in pleurisy it has a stabbing character from the friction of the inflamed membranes against each other at each breath. In phthisis and pneumonia the pain is due to associated pleurisy, the inflammatory process sooner or later affecting the surface of the lung. The interference with the breathing also varies in type. The respiration may be accelerated, or a condition of dyspnea-i.e. difficult breathing-may be produced. When in struggling for breath a patient is compelled to adopt a sitting posture, he is said to have orthopnæa. Rise of temperature occurs in most pulmonary diseases, and is apt to be higher in children than in adults. A cough is an explosive effort, produced after a deep inspiration, by suddenly opening the vocal cords against which air has been compressed by the expiratory muscles, the dia-phragm being relaxed. In bronchitis the cough is often wheezy, and the sputum is generally frothy mucus mixed with pus, though after severe fits of coughing a little blood may be present. pneumonia the cough is attended by pain of the stabbing, pleuritic the suppress it. The sputum is generally gelatinous, sticky, and of a plum colour, which gradually becomes rusty brown as the patient progresses towards recovery. In phthisis the cough varies with the state of the disease. It may be painful and violent, but many patients with phthisis suffer little from cough. The expectoration may be nummular (i.e. in disc-like purulent masses) or hæmorrhagic.

Lungwort, a name given to members of the genus Pulmonaria, a division of the order Boraginaceæ. They bear terminal cymes of bluish flowers, with tubular five-cleft calyces and funnel-shaped corollas. Pulmonaria officinalis was at one time used as a cure for lung diseases. It is a somewhat rare British native. Other species are P. angustifolia, the blue cowslip, and the pink-flowered P. saccharata.

Lunn, HENRY SIMPSON (1859), editor of Travel, born at Horn-castle, Lincolnshire; graduated M.D. at Dublin University, and was for some time a medical missionary in India. In 1892 he founded the Grindelwald Conferences for the consideration of Christian unity, from which scheme he developed popular tours, characterized by educa-

tional elements, such as lectures from distinguished men on the places visited. Recently Dr. Lunn has taken an active part in the organization of the Free Church Federation, and is an original founder of the Liberal Forward Movement.

Lupercalia, the festival of the god Lupercus at ancient Rome (the name signifies 'wolf festival'); it was in origin a festival of the shepherds, and was held on the 15th of February every year in the Lupercal on the Palatine Hill, a place which contained an altar and grove sacred to the god. Here the Luperci, or priests of Lupercus, on the day of the festival, sacrificed goats and young dogs; and, after various ceremonies, cut up the goat skins, part of which they put on their own bodies, and part they made into thongs, with which they ran through the streets of the city striking all whom they met. Women courted their blows, believing that they caused fertility. Mark Antony, when consul, acted as one of the Luperci. See Mar-quardt and Mommsen's Handbuch der Römischen Alterthümer (1871-82); and Murray's Manual of Mythology (1873).



Lungwort (Pulmonaria officinalis).
1, Corolla (opened).

Lupine, a genus of leguminous plants, mostly natives of America, many of which are valued as hardy herbaceous plants in our gardens. The flowers are generally blue or purple, and are most commonly borne in terminal racemes or whorls. The leaves are usually of great beauty, being digitately manyfoliated. Our garden lupines are mostly hybrids.

Among the species are L. polyphyllus, a tall-growing perennial, bearing dark-blue flowers; L. luteus, a yellow flowering annual; L. mutubilis, white and blue, almost a shrub in habit; L. nanus, a Californian dwarf-growing annual, with bluish flowers in summer; L. subcarnosus, a dwarf-growing perennial with downy stem, and deep-blue flowers marked with yellow; and L. nootkatensis, a variegated-flowered perennial, with hairy leaves. Lupines are easily grown from seed in ordinary garden soil.

Lupton, Thomas Goff (1791-1873), English engraver, was one of the engravers employed by Turner on the Liber Studiorum, and also executed plates for The Harbours of England (1856), the letterpress being contributed by Ruskin. Notable plates by him are The Infant Samuel, after Reynolds, and The Eddystone Lighthouse, after Turner. Lupton was the first to substitute steel for copper in mezzotint engraving.

Lupulin, the fine yellow resinous powder secreted by the membranous scales which make up the bulk of the catkin of the hop, Humulus lupulus. See Hors.

Lupus (Lat. lupus, 'a wolf') is a term applied to a group of chronic skin diseases characterized by cortical overgrowth fol-lowed by ulceration. The cause is now recognized to be tubercular infection of the skin. The disease generally commences as a dull red translucent tubercle, or group of tubercles, raised above the surface and gradually increasing in area. The disease is most common in children and females. Until comparatively recent years lupus was almost incurable. Koch's tuber-culin has been used with excellent results, and more recently X and other light rays have achieved even greater success. Much of the credit of the method of treat-ment by light rays is due to Finsen, the Danish doctor.

Lupus, an ancient southern constellation east of Centaur. Alpha Lupi is a helium star of 29 magnitude; γ , ϵ , λ , μ , π , and U A 103 Lupi are all closely double; while β Lupi is a spectroscopic binary.

Lursy, tn., cap. of Page co., Virginia, U.S.A., 76 m. s.w. of Washington, is renowned for its beautiful stalactitic cavern, discovered in 1878. The town has mineral springs, a tannery, and flour mills. Pop. (1900) 1,147.

Lurcher, THE, a cross between the greybound and a sheep dog, and is essentially a poaching animal. Gifted with wonderful instinct, of the keenest sight, scent, and hearing, it enters into the avocations of its master with a perfect knowledge of the duties required of it. It runs with its head low, sneaks along hedges, and is absolutely silent, answering to a motion of the hand, and carrying out its allotted task with the intelligence a sheep dog displays in folding sheep. There are no registered 'points' for a lurcher, and the Kennel Club does not include it as a recognized variety.



Lurgan, tn., Co. Armagh, Ireland, 20 nn. s.w. of Belfast, and 3 m. s. of Lough Neagh; manufactures linens, chiefly cambric, diaper, and lawn. Pop. (1901) 11,782.

Luria, or Loria, Isaac (1534-72), one of the famous 'Five Sages' of the 16th century, chief rabbi of Lublin, was born at Jerusalem. His works are of importance on account of the numerous notices they contain connected with the history of Jewish literature. His Hokhmuth Shetomoh discussions on the Babylonian Talmud, Rashi, and the Tosaphoth is now an integral part of the Talmud editions.

Lusatia, or LAUSITZ, region between the Oder and Elbe, and consisting of Upper and Lower Lusatia. It originally belonged to Bohemia (1319), but in 1635 was taken by Saxony, with whom it remained till the Congress of Vienna (1815), when Lower Lusatia and part of Upper Lusatia were ceded to Prussia.

Lushal Hills, imperfectly explored tract of country on N.E. frontier of Eastern Bengal and Assam, India, occupied by a tribe known as Lushais, a warlike race who are a branch of the Kuki family. In 1890 their country became British.

Lu-shun-kau. See Port

Lusignan, tn., dep. Vienne, France, on river Vonne, 15 m. s.w. of Poitiers; possesses a fine 11th-century church. The Lusignan family furnished kings to Jerusalem and Cyprus during the crusades. Pop. (1900) 2,139.

Lusitania, originally the name of the territory of the ancient Spanish tribe the Lusitani. In this sense it covered the country between the rivers Tagus and Durius (Douro), as far E. as the frontier of Portugal. The Roman province of Lusitania roughly corresponded with the modern Portugal. The chief town of the Lusitani was Olisipo (Lisbon),

but Emerita Augusta (Merida) was the Roman capital. See Mommsen's Hist. of Rome (Eng. trans. 1894), and his Provinces of the Roman Empire (Eng. trans. 1886).

Lussin, or LOSSINI, isl. of Austria, in the Gulf of Quarnero, Istria, about 44½° N. lat. Area, 70 sq. m.; and pop. (1900) 11,615. Chief town, Lussin Piccolo (pop. 7,207); has a good harbour, and is visited as a summer resort.

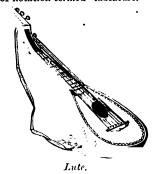
Lustre, in physical optics, is characteristic appearance of certain substances when viewed in ordinary light. Thus, there is the metallic lustre possessed by most, though not all, metals. The most characteristic are gold. silver, platinum, nickel, and aluminium. Each has its own lustre, by which it may be distinguished. The effect depends upon the manner in which the incident light is partly absorbed and partly sent back after a slight penetration into the surface layers. What it exactly consists of is not clearly understood. In pearly lustre, again, we have to deal with a peculiar surface conquiton, inducing to a marked extent the nature of the diffraction in the two rays by which the eyes of the observer see any portion of the surface will differ somewhat; and to this difference in the two simultaneous sensations will correspond some physiological effect. In the case of transparent or translucent bodies, like precious stones and crystals generally, the lustre must be largely conditioned by the

refractive power of the substance. Lustrum ('a lustre') properly means a purification: in particular the purification of the whole Roman people, which took place on the completion of the census. As this occurred every fifth year, the term lustrum came to mean a period of five years. The lustrum was said to have been instituted by Servius Tullius (566 B.C.). The last lustrum took place 74 A.D. See Marquardt and Monmsen's Handluch der Römischen Alter-

thümer (1871-82).

Lute, a stringed instrument of Asiatic origin, popular for centuries, but now obsolete in Europe, though music for the instrument was published so late as 1760. The lute resembled the present form of mandoline in having a pear-shaped convex back built up of staves of various kinds of wood, a flat breast—usually of pine—a bridge, a fretted finger-board, and strings tuned in pairs of unisons; but it differed from the mandoline in having from one to three sound-holes in the breast, in being sounded by plucking the strings with the thumb and fingers instead of striking them with a plectrum, and in having the strings with the thumb and fingers instead of striking them with a plectrum, and in having

in some forms additional strings which were not fingered, but only sounded the notes to which they were tuned. The strings varied in number, according to the type and size of the instrument. The archlute, chitarrone, and theorbo were all large forms of double-necked lutes, having the neck extended to contain another set of pegs regulating unstopped strings which ran alongside and not above the finger-board. Music for the lute was written in a form of notation termed 'tablature.'



Lutes are cements used for making the joints of certain apparatus air-tight. Innumerable formulæ for such compositions are extant, and differ according to whether the joint requires to be heated, to withstand pressure, or to be readily undone. Linseed meal and water, whiting and linseed oil (putty), and red or white lead and linseed oil, are examples of lutes that will not stand heat; whilst Stourbridge clay and water and tire-clay and sodium silicate solution will resist its action. See CEMENT.

Lutetia, or in full LUTETIA PARISIORUM, 'the city of the Parisii,' was the ancient name

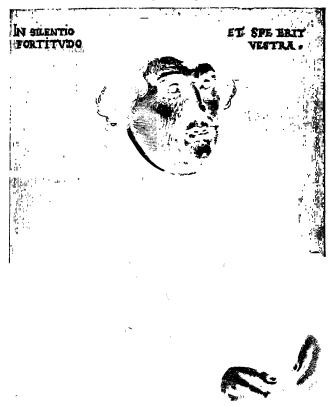
of Paris, France.

Luthardt, Christoph Ernst (1823-1902), Lutheran theologian, was born at Maroldweisach, Franconia, and became professor at Marburg (1854), and two years later at Leipzig, where he died. His works display a clear and well-informed mind, and have enjoyed a vast popularity. The most important are his Apologie ..des Christentums (1864-80; Eng. trans.), Das Johanneische Evangelium (1852-3; Eng. trans.), Die Lehre von den letzten Dingen 1861), Kompendium der Dogmatik (1865). He also edited the Allgemeine Evang.-Luther. Kirchenzeitung (with the Theol. Litteraturblatt), and the Zeitschrift für Kirk, Wissenschaft u. Kirk, Leben. See his autobiography, Erinnerungen aus Vergangenen Tagen (1889), and Life, in German, by Kunze (1903).

Luther, MARTIN (1483-1546). the leader of the Protestant reformation in Germany, was the son of Johann Luther, originally a peasant-proprietor at Möhra, near Eisenach. Thuringia, who migrated to Eisleben, in Saxony, where the reformer was born on St. Martin's Eve (November 10). In 1497 Martin was sent to a Franciscan seminary at Magdeburg, and in the following year to Eisenach. In 1501 he took residence at the University of Erfurt, as a student of law, read widely in the classical and scholastic authors, and gained his bachelor's and master's degrees in 1502 and 1505 respectively. death of a young friend, and the experience of a dreadful storm, acting on a self-distrustful heart, weaned him from jurisprudence, and for peace of soul he entered the convent of the Augustinian monks at Erfurt, July 17, 1505. In the convent he submitted to the most stringent discipline, and in course of time resumed his reading, pondering especially over the fathers and the Bible; but in spite of fasts, vigils, and unremitting industry, he failed to gain the peace of mind he craved for, and fell into a state of morbid melancholy. From this he was eventually delivered through the sympathy of Staupitz, vicar-general of the German Augustinians, and, coming to better views of the divine mercy, was ordained priest in 1507. He left Erfurt in 1508 for a chair in the newly-founded University of Wittenberg, though he still remained a monk and lived in a cell, and here his preaching began to attract attention. In company with John of Mecheln he made a journey to Rome in 1511, and had his eyes opened to the degrading evils which underhay the specious piety of the church. Returning in 1512, he took his degree of doctor of theology, and henceforth his approach to the stage of publicity was rapid. His expositions of the Bible were listened to by students from all parts; his study of Augustine and the mystics, but especially his use of plain, nervous, vernacular speech gave a fresh and striking tone to his He began to publish. discourses. and in 1516 he became superintendent of eleven Augustinian convents. About this time there came to the Wittenberg district the Dominican monk Tetzel, selling pardons and releases from purgatory, in accordance with the indulgence issued by Pope Leo x. Luther refused to absolve some of Tetzel's customers; but as the chicanery continued, he took the decisive step of nailing to the church door at Wittenberg his ninety-five theses in Latin, as a public protest against the Pope's emissary. This was on October 31.

1517, which may thus be reckoned the birthday of the reformation. Copies of the theses were circulated, bought, and read everywhere; the movement towards the purer teaching proceeded apace, and the sales of the indulgence-mongers declined. The news of all this reached the Pope through the archbishop of Mainz, the patron of Tetzel; and Luther, still regarding himself as a true son of the church, sent his Resolutiones (a defence of his thoses) to the church's head. Urged by

Carlstadt to silence, and so far succeeded with Luther as to force him into a position of more accentuated opposition to Rome. The chief result of the debate was Luther's publication of the famous treatises An Address to the Nobility of the German Nation, On the Liberty of the Christian Man, and The Babylonian Captivity of the Church (1520), which won to his side men like Ulrich von Hutten (Melanchthon had already joined him) and practically all the patriotism



Martin Luther.

the Dominican Mazzolini, the Pope summoned Luther to Rome; but in deference to the wishes of the Elector Frederick of Saxony and the emperor, the place of rendezvous was changed to Augsburg (1518), where the papal legate Cajetan, after vainly demanding from Luther aformal recantation, dismissed him in great anger. Luther gained delay by an appeal to a general council of the church, but the celebrated Dr. Eck forced his hand by challenging him and Carlstadt to a public disputation at Leipzig (1519). Eck reduced

of Germany. Meanwhile a papal bull condemning Luther had been prepared in Rome, and was published in Germany; but Luther's rejoinder was to burn it openly in Wittenberg, along with the decretals which declared the Pope's supremacy (December 1520). Towards the close of the same year, the recently-elected Emperor Charles v., at his first Diet at Worms, received command from Rome to execute the bull; but a strong party successfully pleaded delay, and Luther was summoned to meet the diet on April 16, 1521.

He accepted the challenge, and declared he would go to Worms were there as many devils there as tiles on the houses.' He retracted nothing, and the emperor was ready to pronounce sentence. but was again withstood by the electors and princes. After the formal close of the diet, however, the edict of condemnation ever, the edict of condemnation was passed by trickery. But before any attempt could be made to execute it, Luther had been kidnapped by his friendly elector, and conveyed to the Wartburg. Here Luther resumed his writing of books and pamphlets, and completed a translation of the New Testament into German (published Sept. 21 1592 German (published Sept. 21, 1522, with illustrations by L. Kranach; the Old Testament was not finished till 1534). In March 1522 he was in Wittenberg again, preaching, itinerating, and publishing with unabated zeal. But the seeds of reform already sown were now springing up of themselves on every side. Several princes, free cities, and other towns took sides with the new teaching, and it almost seemed as if a mighty transformation was to be realized by relatively peaceful means. But events proved the falsity of the anticipation. The free nobles, smarting under the insolent oppression of the princes and the hierarchy alike, took up arms under Franz von Sickingen; but the movement was soon suppressed, and its leader slain. The Peasants' war (1524-5) was a much more serious affair. The labouring classes, groaning under the taxa-tion of the nobles and the church, gave ready ear to Luther's assertion of the equal freedom and value of all men in God's sight, and under Thomas Münzer raised the standard of revolt against the governing powers generally. The excesses of the insurgents called forth some of the most violent language Luther ever uttered. In 1525 he married Katherina von Bora, an emancipated nun, a step which greatly enriched his character, and strengthened his work. By his hymns (both words and music), by the institution of schools, and the drawing up of catechisms, he deepened the devotional and educational aspects of the reformation, and fixed its principles in the hearts and lives of the people. But his polemics were not yet at an end. When Henry VIII. of England attacked him in a bitter tractate (1522), Luther had been ready with a not less caustic reply; when Erasmus in 1524 directed against him the De libero Arbitrio, Luther's De servo Arbitrio had given more than a Roland for an Oliver: and now he fell out with his old friends Carlstadt and Zwingli re-

garding the sacraments, and at a conference at Marburg (1529) rejected all proposals of peace with the latter. The emporor was still in a mind to crush the whole movement for his own ends, but at Speyer (1529) and Augsburg (1530) the defiant attitude of the princes again withheld him. Luther's labours as author, organizer, and adviser of nobles continued to the end, but his last years were clouded by ill-health. In 1546, on a journey undertaken to bring about a reconciliation in the family of the counts of Mansfeld, his wasted frame succumbed at Eisleben. Luther is fitly reckoned by Carlyle among the 'heroes' of the race. His was a brave, strong, altogether healthy nature; he combined a penetrating insight into facts, lofty courage and in-defatigable energy in dealing with them, and a sincere and simple piety. A signal flaw in his character was his tendency to use rude and intemperate language towards his adversaries.

Among the numerous biographies are those of Melanchthon, Michelet (1835; trans. by Hazlitt, 1846), Koestlin (1875; trans. 1883), Freytag (1883; trans. in America), Kolde (1884-93), Hausrath (1904, etc.), and T. M. Lindsay (1903). His Sümmtliche Werke, in 67 vols., were published at Erlangen (1826-57); re-issue Weimar from 1883; people's ed. 1892; Briefe, ed. De Wette (5 vols. 1825-8); Table Talk (1883).

Lutherans, a name said to have been first applied to the fol-lowers of Luther by Dr. Eck, and now given to those sections of Protestantism which claim most faithfully to represent the principles of the reformer; hence often used in contradistinction to the Reformed Church (Swiss, Anglican, Scottish Presbyterian, etc.). The most general difference between the two communions was that, whereas the Lutherans laid the chief emphasis upon the substantive principle of the reformation—viz., the doctrine of justification by grace through faith—the Reformed Church took its stand upon the formal principle-viz., the regulative authority of Scripture. The first Lutheran university was founded at Marburg (1527). The conference Marburg (1527). The conference at Marburg (1529), summoned in order to bring about a mutual un-derstanding between the parties, resulted in failure, chiefly owing to the obduracy of Luther; and from this point the two sections drifted further and further apart. Melanchthon designed to obtain a basis wide enough for friendly co-operation between Catholicism and both divisions of Protestantism (e.g. in the Augsburg Confession of 1540); but this was declared to be open treachery by the ex-

treme Lutherans, who thereupon removed their chief centre from Wittenberg to Jena. After various bitter controversies, the Osiandrian (1549-67), the Crypto-Calvinistic (1552-6), the Syner-gistic (1555-7), and the conflict regarding predestination (1574-77), unity was restored among the Lutherans by the general acceptance of the Formula of Concord (1580), and from that time their community enjoyed a cen-tury of peace and success. It had already extended its domain to Denmark and the rest of Scandinavia, Poland, the Baltic provinces of Russia, and Holland. But its supremacy in Germany was marked by the growth of a new scholasticism, a tendency to rest satisfied with mere doctrinal orthodoxy - a spiritual stupor, the much-needed awakening from which was given by the Pietistic movement; the Aufklärung also helped to rouse it to strenuousness. In 1817, the tercentenary of the reformation, King Freder-ick William III. of Prussia pro-posed and carried through a scheme of union between the Lutheran and Reformed parties; but certain irreconcilables among the former protested, and ultimately formed an independent body (1841), the Old Lutherans, who are now, however, recognized by government. In Scandinavia the Lutheran Church is episcopalian, but in its home-land the place of bishops is taken by the consistory.

Luton (anc. Luytone or Lygetune), munic. bor., mrkt. tn., and parish in Bedfordshire, England, on the Lea, 30 m. from London. The parish church of St. Mary is an ancient and interesting edifice. The Plait Hall is the great market for the sale of the straw plait made by the women of the town and district. Other local industries are brass and iron works, eccoa works, and the manufacture of felt hats. Pop. (1901) 36,400. See Davis's History of Luton (1855).

Lutsk, tn., Volhynia (Volinsk) gov., S.W. Russia, 147 m. W.N.W. of Jitomir (Zhitomir), cap. of district, at the junction of the Gijitsa with the Stir. It contains a château and Orthodox cathedral, and has manufactures of cloth, glass, and paper, also taning industry. Pop. (1897) 18,525.

Lutterworth, mrkt. tm., Leicestershire, England, 13 m. s. by W. of Leicester. The church of St. Mary is an ancient building, and the old oak pulpit is in part that from which Wycliffe (rector here, 1374-84) first preached the reformed doctrines. In restoring the church an interesting wall-painting representing the general resurrection was discovered. Pop. (1901) 11,029.

Lüttich. See Liège.

Luttringhausen, tn., Rhine prov., Prussia, 5 m. s. E. of Elberfeld; manufactures ironmongery, cotton goods, and brandy. Pop. (1900) 11,261.

Lützen, tu., prov. Saxony, Prussia, 12 m. s.w. of Leipzig; is noted for its two battles—the first fought on Nov. 6, 1632, between Gustavus Adolphus of Sweden and the Austrians under Wallenstein. The second battle took place on May 2, 1813, when Napoleon I. defeated the combined Russian and Prussian forces. Pop. (1900) 3,838.

Lützow, Ludwig Adolf Wil-HELM, FREIHERR VON (1782-1834). Prussian general, was empowered in 1813 to raise the corps of freelances which subsequently bore his name. This body of patriots, clad in black (hence the designa-tion 'Black Troop'), and number-ing less than 500 cavalry and 3,000 foot, made for itself a notable name in the Napoleonic wars. In 1889 an infantry regiment of the German army, which traced its origin to Lützow's corps, received his name. See K. von Lützow's Adolf Lützows Freikorps in den Jahren 1813 und 1814 (1884), and Jagwitz's Geschichte des Lützowschen Freikorps (1892).

Luxembourg, prov., Belgium, in the extreme S.E., covered in great part by the wooded plateau of the Ardennes. Iron is mined, and iron wares, cattle, leather, and cloth are produced. Area, 1,705 sq. m. Pop. (1900) 219,200. Chief town, Arlon.
Luxembourg, François

HENRI DE MONTMORENCY - BOU-TEVILLE, DUC DE (1628-95), took part in the wars of the Fronde, but pardoned (1659), was subsequently created Duc de Luxembourg. Given a command against Holland in 1672, he defeated the Dutch, and finally carried out a magnificent retreat from Utrecht. He defeated William III. of England at Louze (1691), at Steen-kerk (1692), and at Neerwinden (1693). See Beaurain's *Histoire* Militaire du Duc de Luxembourg (1756), and Memoirs . . . écrits par lui-même (1758).

Luxembourg Palace. PARIS.

Luxemburg. (1.) Formerly Lützelburg, independent grand-duchy of Europe, but included for commercial purposes in the German customs union, is situated between France, Belgium, Lorraine, and Rhineland. Area, 997 sq. m.; pop. (1900) 236,543. The people are almost entirely Roman Catholics, and of Germanic descent. The grand-duchy forms a low plateau (1,800 ft.), intersected by several valleys, and is drained by the Moselle and its tributary the Sauer (Sure).

The chief crops are cereals, flax, hemp, rape-seed, and the vinc. Meadows and grass cover 151 per cent. of the area, and forests 29 per cent. The mining and smelting of iron ore form one of the most important occupations. Gloves, leather, pottery, paper, cloth, beer, sugar, and vinegar are manufactured. The grandduke is a constitutional sovereign, and is assisted by a Chamber of Deputies. The history of the state begins with the countship of Lützelburg, founded in the 10th century, and converted into a duchy in 1354. In 1444 Luxemburg was united with Burgundy, in 1555 with Spain (but at the same time accounted as a state of the empire), in 1659 in part with France, in 1713 again with the empire, and in 1797 once more with France. In 1815 it was made a member of the German Confederation, although linked by personal union with the crown of Holland. On the death of William III. of the Netherlands in 1890, the grand-duchy descended to Adolphus, Duke of Nassau (1817-1905), who was succeeded as grand-duke by his son William (1852). (2.) Capital of above grand-duchy; is a picturesque town, crowning a rocky peninsula above the little river Alzette, with three industrial suburbs-Pfaffenthal, Grund, and Clausen-at its feet. It was stormed or captured by the Burgundians in 1443, by the French in 1479, 1542, 1684, and 1796. The industries include tanning and the manufacture of gloves, pottery, vinegar, and machinery. Pop. (1900) 20,900. See T. H. Passmore's In Further Ardenne (1905), and H. Pflips's Das Luxemburger Land (1895).

Luxeuil (anc. Lixovium), tn., dep. Haute-Saône, France, at foot of Vosges Mts., 27 m. N.W. of Belfort; contains a fine 14th century church and remains of a monastery founded by St. Columbanus (590). Has mineral springs, and is noted for its baths. Pop. (1901) 5,294.

Luxor. See THERES.

Luynes (or Luines), Charles D'Albert, Duc De (1578-1621), constable of France, who insti-gated Louis to crush the Huguenots in the south. Luynes failed to take Montauban, their chief stronghold (1621). He was suc-cessful, however, at Montheur, but died at the moment of victory.

Luz, the name of two places in Palestine. The first was a village close to Bethel (Gen. 28:19); the second was in the country of the Hittites (Judg. 1:23).

Luzan, IGNACIO DE (1702-54). Spanish scholar, man of letters, and founder of the French school in Spain. He was the first to publish in Spanish some of Milton's verse, and his appreciations of Lope de Vega, Cervantes, and others, are excellent. His 'Art of Poetry' (La Poetica o Reglas de la Poesia, 1737), advocating purer style and ideals, is his principal work. See Ticknor's Hist. of Spanish Literature, vol. iii. (1849), and Alcala Galiano's Historia de la Literatura (1845).

Luzern. See Lucerne. Luzon, or Luçon, the largest and most northerly of the Philippine Islands. In the s.w. of the island is Manila, the capital. Area estimated at 40,000 sq. m. It consists of coastal plains and a central mountainous district, among which fertile valleys occur. Several volcanoes are still active. including Mavon and the Taal. The highest mountains and the largest rivers are in the N. of the island; in the s. there are several The soil is fresh - water lakes. admirably adapted for the culture of tobacco, sugar, rice, and manilla hemp. The bulk of the popula-tion is of mixed Malay, Chinese, and Latin stock, with a slighter infusion of Indonesian blood; but the tribes in the hills are of the Negrito or of mixed Negrito and Indonesian origin. A line of railway, 120 m. long, was opened in 1892.

Luzula, a genus of plants, order Juncaceæ. They have flat. grasslike leaves, covered with long white hairs, a browrish chaffy perianth of six parts, six stamens with yellow antlers, and a one-celled capsule containing three seeds. Among the British species are L. sylvatica, the great woodrush; L. campestris, the field wood-rush; and L. pilosa, the hairy wood-rush.

Luzzatti, Luigi (1841), Italian statesman and jurist, of Jewish origin, born at Venice; became professor of constitutional law at Padua (1867), and at Rome (1900). He entered Parliament (1871), and became a recognized authority on financial and commercial matters. He was minister of the treasury (1891-2 and 1896-8), when he organized the finances of Italy on a sound basis. In 1906 he was again appointed minister of the treasury. Amongst his books are Emulazione e Progressi delle Banche di Emissione in Italia (1886); Cronaca delle Coo-perazioni (1888); and L'Abuso del Credito e la Finanza Italiana (1889).

ALEXEI FEODOROVITCH Lvov, (1799-1870), Russian violinist and composer, born at Reval, who became a general in the Russian army (1836), and at the same time conductor of the imperial court choir. His best known melody was adopted as the Russian national anthem to Shukowski's words (1833). He wrote violin concertos, operas, and numerous chants and tunes used by the Russian Church.



Some noted English Lych-gates.

LXX. (abbreviation for Septua-ginta), the Septuagint, the most ancient version of the Old Testament (Greek). See BIBLE.

Lyakhov. See NEW SIBERIA

Island.

Lyail, SIR ALFRED COMYN (1835), English administrator and author, born at Coulston, Surrey; was licutenant-governor of the North-West Provinces, India (1882-7), and was appointed a member of the council of the Secretary of State for India (1888). He has written The Rise of the British Dominion in India (3rd ed. 1905), Asiatic Studies (1882-99; 2nd ed. 1899), Warren Hastings (1889), Tennyson (1902), and Life of the Marquis of Dufferin (1905).

His administrative work is no-ticed in Lord Roberts's Forty-one Years in India (1897).

Lyall, EDNA (d. 1903), pseudonym of Ada Ellen Bayly, English novelist; a native of Brighton, whose first published work, Won by Waiting (1879), met with little success, although Donovan (1882) and its sequel We Two (1884) at once attracted a large reading public. Her other works include In the Golden Days (1885), Knight Errant (1887), A Hardy Norseman (1889), Derrick Vaughan (1889), Doreen (1894), and The Hinderers (1902). See Life by Payne (1903) and by Escreet (1904).

Creet (1904).

Lycabettus, conical hill, Greece, being an offshoot of the range of Pentelicus, N.E. of Athens; height, 900 ft. It is now called Mt. St. George.

Lycanthropy (Gr. lykos, 'a wolf;' and anthropos, 'a man') is the resulter power once attribute.

is the peculiar power once attributed to certain people, of assuming the character and the appearance of wolves. Such men were called 'lukanthropoi' (Gr.), 'loups-garous' (Fr.), 'werewolves' or 'men-wolves,' turnskins,' and 'shape-changers' (Eng.). The term lycanthropy is not restricted to its literal meaning, but includes the power of assuming any animal shape—usually that of wolves, dogs, and bears. In Norway the belief still exists that the Lapps have the faculty of turning themselves into bears. There are numerous traditions in Europe of werewolves. The origin of the belief in lycanthropy is very ancient and very obscure. The theory of the remnants of a cannibal tribe surviving in the midst of a higher race, or of a strain of ancestral savage blood occasionally manifesting itself, may find support in a Middle-English MS. quoted by Halliwell, which distinctly states that cannibals 'are called werewolves. On the other hand, it is well known that children and primitive peoples have the faculty of convincing themselves and their

comrades that they have temporarily assumed the shape of animals, without the slightest actual change in their appearance. (See GLAMOUR.) The stories of ghouls and vampires cannot easily be differentiated from those of werewolves. Mr. S. R. Crockett has made effective use of the werewolf superstition in his novel of The Black Douglas (1899). See also S. Baring Gould's Werewolves (1865).

Lycaon, in ancient Greek legend, a king of Arcadia, the son of Pelasgus, of whom it is related that he was the first civilizer of Arcadia, and that he was turned into a wolf because he offered human sacrifices to Zeus. The various accounts are given by Apollodorus, Dionysius of Halicarnassus, Ovid, and Pausanias.

Lycaonia, ancient district of Asia Minor, bounded by Galatia on the N., Cappadocia on the E., Cilicia on the S., Isauria and Phrygia on the w. Its chief cities were Derbe, Iconium (the capital), Lystra, and Laodicea. It became a separate province in 373 A.D., and now forms part of Konia vilayet. See Wilson's Asia Minor (1895); Ramsay's Historical Geography of Asia Minor (1890).

Lycaste, a genus of tropical American orchids. The flowers are characterized by a transverse appendage at the middle of the lip. The species include L. Deppei, with pale greenish flowers with markings, the lip being white, spotted with crimson, and furnished with a golden crest; L. cruenta, green and orange, the lip being orange and crimson; L. aromatica, yellow, with hairy lip; and L. jugosa, white, with purple stripes. Many of the species are easily cultivated, and require but little heat.

Lyceum, The, was a famous

gymnasium at ancient Athens, which stood outside the walls, to the south-east, on the bank of the Ilissus. It took its name from the temple of Apollo Lycius, and was famous as the scene of the teaching of Aristotle and his followers, the Peripatetics. Hence is derived the French term. lycée, for a secondary school. See Frazer's Pausanias (1900).

Lyceum Theatre, THE. This theatre is the third erected in the same site—Wellington Street, Strand, London. The first (built 1794-5) was not licensed till the Drury Lane company took temporary possession (1809), and was the English Opera 310). The second was renamed House (1810). opened (1816), when notable performances took place by Mrs. Keeley and Edmund Kean, until it was burnt down (1830). third dates from 1834. The The Mathews-Vestris management is

memorable for Planche's 'fairy extravaganzas' and Beverley's transformation scenes. Fechter became manager (1863), and played in English and French. Under in English and French. the Batemans' management (1873-78), Irving made his first appearance at the Lyceum, and inaugurated his own management (1878) by a revival of *Hamlet*, with Ellen Terry as Ophelia. From that time the house was largely identified with Shakespearean productions, Sir Henry Irving maintaining the highest traditions of English dramatic art. The theatre was transferred to a limited liability company (1899), and shortly afterwards (May 1901) the London County Council insisted on structural alterations which could not be carried out. Irving therefore gave his last performance there on July 19, 1902. The house is now a music hall.

Lych-gate, or CORPSE-GATE, a covered, usually gabled churchyard gate, beneath which it was formerly customary for a bier to rest during the reading of the introductory part of the service. There are numerous examples in Great Britain-notably that at Bray, which is said to date from 1448.



Lychnis. 1. L. flos-cuculi; 2, petal; 3, L. fulgens,

Lychnis, a genus of plants, order Caryophyllaceæ, characterized by its flowers possessing a tubular, five-cleft calyx, five long-clawed petals, ten stamens united at the base with the stalk of the average of the control of the call of the careful of the ovary, and five styles. Five species are natives of Britain, the commonest being L.

diurna, the red robin or campion of our hedges, with its downy leaves and pink flowers; the white-flowered L. respertina (evening campion), whose flowers become fragrant as night approaches; and L. flos-cuculi, the ragged robin of our marshes, with its purplish stems and narrowly-segmented, ragged, rose-coloured petals. Of the cultivated species, we may name L. chalccdonica, a Russian perennial bearing clusters of scarlet flowers in summer; L. coronaria, red-flowering; L. fulgens, a dwarf-growing, scarlet-flowered species, with several beautiful varieties, notably L. f. Hangeana; and L. riscaria, the red German catch-fly, a rare British plant, with pink flowers.

Lycia was a district at the s.w.

Lycia was a district at the s.W. angle of Asia Minor, bounded on the w. by Caria, on the N. by Phrygia and Pisidia, and on the E. by Pamphylia. The inhabitants strenuously resisted Greek colonization; Crossus failed to conquer them, and the Persians did so with difficulty, though in the 4th century B.C. they became subject to the Carian tyrants. The chief cities were Xanthus, Patara, Pinara, Tlos, Telmessus, Myra, Limyra, and Olympus. In the 5th century they joined the Athenian league, but with the rest of Asia Minor they became subject to Rome. A fine collection of Lycian remains is in the British Museum. See Grote's, Holm's, and Bury's Historical Geography of Asia Minor (1890); Fellows's Discoveries in Lycia (1841); Bonndorf's Reisen in Lykien und Karien (1884).

Lycium, a genus of climbing or trailing plants, order Solana-ceæ. Most of the species produce beautiful funnel-shaped flowers in great profusion, and are worth growing as trellis plants. Among the best are L. barbarum, bearing yellow and purple flowers; L. afrum, a spiny shrub with solitary, drooping, yellow flowers; and L. europæum, used for hedges in the Greek islands.

Lyck, or Lyk, tn., prov. E. Prussia, Germany, 88 m. s.e. of Tilsit; contains on an island in Lake Lyck a castle of the Teutonic Knights dating from 1273, Manufactures machinery and leather. Pop. (1900) 11,419.

Lycomedes, in ancient Greek legend, was the king of the Dolopians, in the isle of Seyros, to whose house Achilles was sent by his mother Thetis, in the disguise of a girl, to save him from the Trojan expedition. When Theseus sought his protection, Lycomedes treacherously hurled him over a rock. The story is told by Apollodorus, Pausanias, and Plutarch.

Lycoperdon, or PUFF-BALL, a genus of gasteromycetous fungi, several species of which are common in Britain, L. gemmatum being the most common. When they first appear they are masses of solid, nearly homogeneous, white flesh; but as they grow older the white colour gives way to brown, and the solid mass is replaced by a dry and shrivelled rind or casing containing within a quantity of fine brown powder—the spores.



Lycoperdon gemmatum.

Lycophron (c. 260 B.C.), a celebrated grammarian and poet of the Alexandrian school, was a native of Chalcis in Eubea. His only extant work is the Alexandra or Cassandra, a long monologue consisting of 1,474 iambic verses, in which Cassandra prophesies to Priam the destruction of Troy. Editions: Tzetzes (1546), Canter (1596), Potter (1702), Reichard (1788), Sebastian (1804), York (1806), and Holzinger (1895).

Lycopodium, a genus of plants commonly known as elub mosses (order Lycopodiaccæ), many of them desirable and handsome plants. Among the stove species are L. Hookerii, an evergreen, and L. Phlegmaria. Among the hardy species, which may be grown in the shade without glass protection, are L. clavatum, L. dendroiderum, recembling a tiny fir tree, and L. alpinum, with prostrate stems and evergreen leaves.

Lycurgus. (1.) A famous Spartan lawgiver, who is said to have lived about the beginning of the 9th century B.C. The common account is that he was the son of Eunomus, king of Sparta, and brother of Polydectes, the latter of whom succeeded to the throne, and then died, leaving his wife with child. When the child (Charilaos) was born, Lycurgus proclaimed him king, and acted as his guardian. He left Sparta for some time,

and on his return found the country in a state of anarchy, when all parties called him to the task of restoring order. This he accomplished, redividing the land among the citizens, and introducing the constitution, which, with few alterations, remained as long as Sparta existed as a state. He was afterwards worshipped as a god at Sparta. (2.) Athenian orator and statesman (c. 396-323 B.C.), who was a pupil of Plato and Isocrates, and supported Demosthenes against Philip. Alexandral ander demanded his surrender (with that of Demosthenes) for inciting Thebes to revolt (336), but finally gave up his claim. Lycurgus was one of the leading statesmen at Athens, and was a most successful minister of the public revenue (338-326). Editions: Rehdantz (1876), Thalheim (1880), and Nicolai (1885).

Lyda, a genus of sawflies, hymenopterous insects (family Tenthredinida), whose larvæ are among the pests of the arboriculturist. Their pupal stage is passed in the soil, and they spin a web over leaves, within which web several larvæ may usually be found. L. Pyri and L. nemoralis are the species which are most injurious to British fruit trees.

Lydda, or LoD, city, Palestine, on the plain of Sharon, 10 m. S.E. of Joppa, near the foot of the hills. According to 1 Chron. 8:12, it was founded by Shamed, of the tribe of Benjamin. It is noticed on monunents as early as 1600 B.C. It is now a small village (Ludd) with a church of St. George, founded in the 12th century A.D., and repeatedly destroyed and rebuilt.

Lyddite, a high explosive used in the British service as a bursting-charge for shells. It consists of pieric acid, C₆H₂(NO₂)⁸ OH, prepared by the action of nitric acid on phenol, and consolidated by melting. It is an intensely bitter crystalline solid of bright yellow colour, and explodes only with difficulty under the influence of a powerful detonator, producing yellow fumes, as the explosion is usually incomplete. The name lyddite is derived from Lydd in Kent, where the explo-sive was first tested. The late South African war showed lyddite to be less effective than had been anticipated—for example, in the eight days' bombardment of Cronje at Paardeberg - and experiments to obtain a superior explosive are in progress (1906).

Lydenburg, cap. of div. of same name, Transvaal Colony, S. Africa, in a well-watered and fertile hollow at the w. base of Mauch Berg, 144 m. E.N.E. of Pretoria. It is a gold-mining town, in a district well suited for the cultivation of cereals (espe-

short, stumpy tail, and tufted ears. The colour is light brown or gray, spotted with a darker shade. In habitat the animals are largely arboreal, and they are remarkable for their ferocity and savage disposition. Their soft, thick fur is highly valued by furtiers. In N. Europe and in Asia Felis lymx occurs; in N. America F. camadensis and F. rufus, the latter the American wild eat' or bay lynx, together with two other species or varieties. Asia has also three other species or varieties in addition to F. lymx.

Lynx, a small constellation north of Gemini, formed by Hevelius in 1690. It contains many double stars, one of which, 12 Lyncis, has a computed period of 486 years. R and S Lyncis are extensively variable in long

periods.

Lyon Court. The Lyon Court is one of the judicatories of the kingdom of Scotland, the integrity of which is guaranteed by one of the articles of the treaty of Union of 1707. It is charged with (1) the administration of the laws of arms among his Majesty's subjects of Scottish descent; (2) the settlement of claims to precedency in Scotland; (3) the regulation of public processions and ceremonials; (4) the recording of pedigrees; and (5) the appointment and superintendence of the officers styled messengers-atarms, who are charged with the execution of legal diligence, authorized by the supreme courts of Scotland. The court is composed of the Lord Lyon and his brethren heralds. Its decisions on all matters of heraldry and precedency are final; but should any subject consider his patrimonial rights to be invaded by any sentence of the court, he may appeal for redress to the Court of Session. At what date the court was established is not clear. The Lyon herald is referred to in the Exchequer Rolls of 1377, and the earliest official armorial now in existence is that executed by the poet Sir David Lindsay of the Mount, then Lyon King of Arms, in the reign of King James v. (1513-42). His work was acknowledged as the official register for the kingdom by the Privy Council of Scotland on December 9, 1630. During the usurpation the registers remained in the custody of Sir James Balfour of Denmiln, knight, Lyon King (1630-57), and these records are now in the Advocates' Library, Edinburgh. The present register is complete from the year 1672. and no persons of Scottish descent whose arms are not registered in it have the right to use armorial bearings. By an act of Parliament passed in the reign of King Charles II., Sep. 10, 1672, the Lyon King and his brethren heralds are empowerd, not only to matriculate the arms of those entitled to record, but also to grant arms to virtuous and welldeserving persons—a phrase liberally translated by the Lyon Court. The fees for a matriculation are about £16, and for a new grant about £45—those amounts being fixed by 30 Vic., cap. 17, and payable to H.M. Exchequer. The court of the Lord Lyon at present consists of the Lord Lyon King of Arms, Albany, Ross, and Rothesay heralds, and Carrick, March, and Unicorn pursuivants. The staff includes a Lyon clerk and keeper of the records (who for a considerable time past has been one of the heralds), a procurator fiscal, a herald painter, and macer. The offices are situ-ated in H.M. General Register House, Edinburgh. See HERALD.

Lyonesse, the land of the Arthurian legends, in which was Arthur's city of Camelot, variously held to have been either the present Cornwall or a country stretching beyond it westwards and now covered by the sea. It is the scene of the story of Tristan and Iscult, and of the episodes included in Tennyson's Idylls of the King. See Malory's Morte d'Arthur, and other works dealing with the Arthurian legends. See also Swinburne's Tristram of Lyonesse (1882).

Lyonia, a genus of North American and West Indian shrubs and trees, order Ericaceæ, with alternate leaves and small flowers with urceolate corollas. Among the species are L. ferruginea, with white flowers in spring, the whole plant being covered with rusty-looking scales; and L. ligustrina, a hardy shrub, bearing clusters of small white flowers.

clusters of small white flowers.

Lyon King of Arms. Se
Lyon Court, and HERALD.

Lyonnais, anc. prov. of

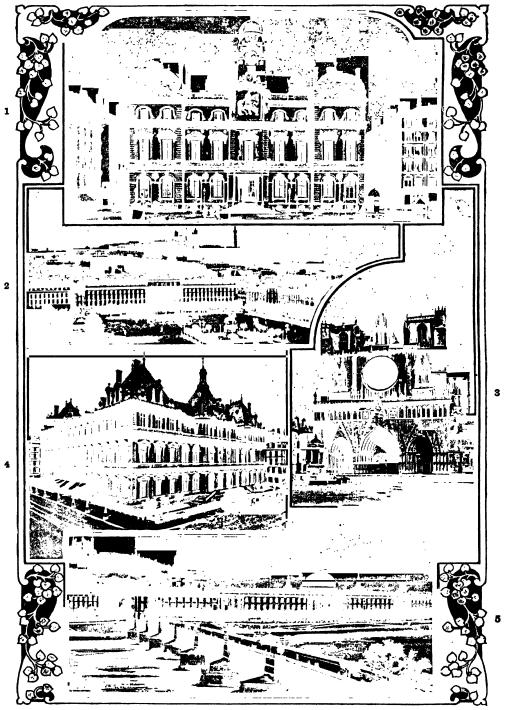
Lyonnais, anc. prov. of France; it formed one of the Roman divisions of Gaul. At first part of Burgundy, it was united to France in 1310, and forms the departments of Loire

and Rhône.

Lyons (Fr. Lyon; Lat. Lugdunum), city and episc. see, dep. Rhône, France, stands at the confluence of the Rhone and the Saône, and is the third city of the country. It is 240 m. s.s.e. of Paris, and 170 m. N. by W. of Marseilles. The city, a fortress of the first class, is also fortified by a strong wall (13 m. in circumference) on the N. and E. sides. The silkworms reared in the Rhone valley, and the proximity of coal and iron (at St. Etienne, 36 m.), have made Lyons, the first silk manufacturing town in France. The city is likewise the natural focus of commerce from

N. and S., and both the Rhone and the Saone are connected by canals with all the great waterways of France. Lyons is adorned with numerous interesting and beautiful buildings, amongst which may be mentioned the cathedral of St. Jean (12th to 15th century); the archiepiscopal palace (15th century restored); the church of St. Martin d'Ainay, which is built on the site of a Roman temple. and contains the remains of a Roman votive altar; the Hôtel de Ville (1646); and several extensive and admirably arranged picture galleries and museums, in addition to a state university ranking next to that of Paris in the number (2,500) of its students, and a public library, which boasts some of the earliest extant speci-mens of printing. The Parc de la Tête-d'Or, on the bank of the Rhone, contains a large lake. At the entrance is a monument commemorative of the heroes of 1870-71. The silk industry (first established in 1450 by Italian refugees) is centred in the city, but most of the factories lie in the surroundthe factories he is an illages— ing country towns and villages— such as Villeurbanne, Ste. Foy, Caluire-et-Cuire, etc. The industries (which are largely conducted on the 'domestic' system of manufacture) employ about 300,000 persons in and about Lyons, and the best qualities of silk are made in the suburb of La Croix Rousse in the s.E. The value of the silk and stuff production was (1905) £15,708,000—the output of some 100,000 looms, of which 500 are power-looms. Raw silk comes chiefly from Japan and China (52 per cent.), and from the Rhone valley, Italy, and the Levant. The export of manufactured silk goods in 1905 was £12,143,360. Other manufactures are those of cottons, hardware, dyes, sulphuric acid, chemical chemical manure, starch, candles, soap, paper-hangings, and machinery, and much business is done in chestnuts, cheese, and wine.

Lyons was founded B.C. 40, and under Augustus was made the capital of Celtic Gaul. Roman baths and remains of a theatre, tombs, walls, and aqueducts still remain. The city was the scene of early Christian persecutions in the 2nd century; was ravaged by barbarians, and later, in 736, by the Saracens; and became the capital of the Burgundians in 478. It suffered severely during the religious wars of the 16th century. At first it eagerly embraced and then renounced the cause of the revolution (1789-93), suffering accordingly from the ultimately victorious revolutionists. Lyons was the birthplace of three Roman emperors—Claudius, Marcus Aurelius, and Caracalla; of Parelius, and Caracalla; of Parelius, and Caracalla;



Views in Lyons.

mentier, who introduced the potato into France; Say (1767), the political economist; Marshal Suchet (1770); the chemist and physicist Ampère (1775); Madame Récamier (1777); Jacquard (1806), inventor of the figured pattern loom; and the painter Meissonier (1815). Lyons is the stronghold of French Catholicism. Pop. (1901) 459,099. See works for topography by Joanne (1885), and for history by Metzger (1881-5).

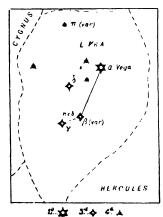
Lyons, GULF OF. See LIONS,

GULF OF.

Lyons, EDMUND, LORD (1790-1858), English vice-admiral, born at Burton, Hants; distinguished himself in the capture of Banda Neira (1810), and in the storming of Marrack (1811); commanded in the Mediterranean (1828-35), rendering great services to the cause of Greek independence; afterwards appointed British minister at Athens, where he remained until 1849, subsequently occupying other diplomatic positions. At the outbreak of the war with Russia he became second in command in the Black Sea, and soon afterwards commanderin-chief in the same waters. Created a military G.C.B., Lyons was raised to the peerage for his. services during the war (1856).

Lyons, RICHARD BICKERTON PEMELL (1817 - 87), first Earl Lyons, educated at Winchester and Oxford; became minister at Washington (1858), ambassador at Constantinople (1865), and at Paris (1867 - 87). During such crises as the *Trent* difficulty (1861) and the Franco-German war (1870-1) he showed firmness

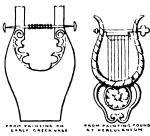
and discretion.



The Constellation Lyra.

Lyra, an ancient constellation, situated on the borders of the Milky Way, near Cygnus. Its primitive association with an eagle or vulture survives in the

name Vega, its largest star. Two pairs of white stars of iifth and sixth magnitudes are combined in the quadruple system of ϵ Lyrae. β Lyrae is a spectroscopic binary, varying in light from 3.4 to 4.0 in 12 days 21½ hours, and shows a remarkably fluctuating bright - line spectrum. Other variables are R V Lyrae, eclipsed once in 3½ days; γ Lyrae, a specimen of the 'cluster-type;' and R T, V, W, and Z Lyrae, all belonging to the Mira class. The wonderfui Ring-nebula' (Messier 57) lies between β and γ Lyrae.



Lyres.

Lyre, an ancient musical stringed instrument of Eastern origin. It consisted of a hollow resonant body, from each end of which rose a gracefully curved horn-shaped arm, turning outwards at the top. The upper parts of the two arms were connected by a cross-bar, to which the strings were attached; and the latter, after passing over a bridge resting on the body, had their lower ends fastened to the bottom of the instrument. The strings, varying in number from three to eighteen, were sounded by being struck with a plectrum held in the right hand, while the fingers of the left hand checked the vibrations of those strings required to be silent. The Greek cithara was a large form of lyre.

Lyre - birds are interesting passerine birds, found only in Australia, and remarkable for the two lyrate feathers found in the tail of the male. The birds live chiefly on the ground, and their long and stout metatarsi, straight and powerful claws, and strong bill justify the Australians in their designation of 'pheasant,' although these resemblances to a game-bird are superficial only. The wings are rounded and rather short; and in the tail, in addition to the lyrate plumes, there are twelve feathers without barbules, and two with wielly-separated barbs, and two with very narrow webs. The lyre-bird of New South Wales and Queensland (Menura superba) is dull brown, with rufous throat, wings and tail coverts, and transparent notches on the outermost

tail feathers. It reaches a length of thirty-three inches. The cocks have 'playgrounds' where they display themselves before the hens. There is only one egg, and the nest is oval and domed.

Lyric ($\lambda \nu \rho a$, 'lyre,' a stringed instrument used by the Greeks) is according to its derivation.

is, according to its derivation, poetry sung to a musical accompaniment, as opposed to epic, spoken or recited poetry, and dramatic, which combines lyric and epic. If iambic and elegiac, originally mere forms of lyric, are excluded, lyric coincides with the more technical Greek term melic. which covers both the song (such as love-song) of an individual performer and the song of a chorus in the dithyramb and other forms of ode. Most modern lyrics are not actually sung, and various attempts have been made to dethe lyric in the modified sense which has resulted. The most familiar is that of the late Mr. Palgrave: 'Lyrical has been held essentially to imply that each poem shall turn on some single thought, feeling, or situation.' But this does not adequately bring out the essence of lyric, which is really in the expression of emotion, to which the elements of thought or situation, or both, are wholly subordinate. And as emotion is the condition of mind which causes and justifies that heightened and rhythmical mode of statement which is called poetry, it becomes true to say that the lyrical quality of poetry is that in virtue of which it is poetry at all. In elegiac poetry the emotional quality is balanced by one no less strong of reflection;



Lyre-bird.

in idyllic poetry by one no less strong of description. These two make up the bulk of modern poetry, together with pure lyric, in which, whatever else may be present, the emotional quality is supreme. The distinctions here drawn are between poetical moods rather than between individual poems, which do not, of course, lend themselves to any such pre-

cise classification.

Historically speaking, lyric began with communal or folk song, in which a group of workers in the common field or spinninghouse, or of revellers at the common festival, expressed to the rhythms of toil or of the dance their common and primitive emo-tions. The typical folk-song came in time to consist of a sentiment sung by a leader, and a refrain or burden repeated by the chorus; and this has left many traces upon the forms of lyric. But so far as the spirit of lyric is concerned, the whole tendency of modern development has been to get away from folksong, and to substitute for the expression of a communal emotion that of an emotion which is as personal and intimate as possible. This process had been in part anticipated in Greece, where the personal lyric of Alcaus and Sappho of Lesbos and Anacreon of Teos stands side by side with the choral lyric of Pindar of Thebes and Bacchylides of Ceos, and of the great Attic dramatists, in which much of the communal element is preserved. Latin lyric, in Catullus and Horace, is mainly an exotic thing borrowed from Greece. A native Italian lyric comes to artistic form once, and once only, in the Pervigilium Veneris of the 2nd century A.D. Mediæval romance lyric, on the other hand, makes a fresh start from folk-song, out of which the minstrels of N. France, Provence, and Italy developed a large numher of distinct types of song. These include the sonnet, the ballade, the rondeau, the rondel. Simultaneously a religious lyric grew up at the hands of the great Latin hymn-writers, such as Adam of St. Victor, and an important link between sacred and secular was found in the class of wandering scholars, who readily introduced the one to minstrelsy, the other to the cloister.

The earlier history of English lyric is obscured by the non-lyrical character of such Anglo-Saxon poetry as remains, and by the blotting out of English as a literary tongue for two centuries after the conquest. Under the early Tudors the song, in the strict sense, becomes of importance. The fashion of singing to the lute, viol, or virginals endured right through the Elizabethan period, and largely determined the character of lyric poetry. The lyric of Thomas Campion and of the innumerable and mainly anonymous writers of

the song books, the lyric of Thomas Lodge and Nicholas Breton, the lyric scattered through the plays and masks of Shakespeare, of Ben Jonson, of Beaumont and Fletcher, is primarily intended to be sung. Meanwhile more claborate and artificial forms of lyric were introduced as a result of the study of European and classical poetry Sir Thomas Wyatt and the Earl of Surrey, under Henry VIII., naturalized the sonnet. Edmund Spenser is mainly responsible for the Greek forms of ode and epi-thalamium, and for the pastoral convention so dear to the Elizabethan writers. Spenser is the dominant influence in English lyric until well into the 17th century, when the example of John Donne, far less musical but more intellectualized, individual, and passionate, led to the formation of a group of court poets, among whom were Thomas Carew, Sir John Suckling, William Habington, Abraham Cowley, and Thomas Randolph. Somewhat aloof from these, and with more affinities to the earlier school, stand John Milton, Andrew Marvell, and Robert Herrick. A group of religious lyrists includes the Auglican George Herbert and Henry Vaughan, and the Catholic Richard Crashaw. The transition from the imaginative lyric of Donne to the witty lyric of the restoration is represented by Edmund Waller; and the latter itself by Sir Charles Sedley, the Earl of Rochester, and John Dryden. Thereafter lyric disappears from English literature, until at the end of the 18th century the voices of William Collins and William Blake herald the second great lyrical period, which has ex-tended from Wordsworth, Cole-ridge, Byron, Shelley, and Keats to the writers of our own day.

See general historics of literature and poetry. For selections, see F. T. Palgrave's Golden Treasury of Songs and Lyrics (1861; 1883; pt. ii., 1897); R. C. Trench's Household Book of English Poetry (1868, 1870); T. H. Ward's The English Poets (1887-94); A. H. Bullen's Lyrics from the Song Books of the Elizabethan Age (1891); A. H. Miles's Poets and Poetry of the Century (1891-97); W. Watson's Lyric Lore (1892); R. H. Caine's Love Songs of English Poets (1892); G. Saintsbury's Seventeenth Century Lyrics (1892); H. C. Beeching's A Paradise of English Poetry (1893, 1896); A. T. Q. Couch's The Golden Pomp (1895), Oxford Book of English Verse (1902); F. E. Schelling's Elizabethan Lyrics (1899); Seventeenth Century Lyrics (1895), Seventeenth Century Lyrics (1899); J. C. Collins's Treasury of Minor British Poetry (1896); A. Mey-fritish Poetry (1896); A. Mey-fritish Poetry (1896); A. Mey-

nell's The Flower of the Mind (1897); W. E. Henley's English Lyrics (1897); F. I. Carpenter's English Lyric Poetry (1897); Stenhouse's Illustrations of the Lyric Poetry and Music of Scotland (1853); and E. Arber's British Anthologies (1899-1901).

Lys, riv., France and Belgium, rises in dep. Pas-de-Calais, and flows N.E. through Nord to form the boundary between France and Belgium. It then continues N.E. through W. and E. Flanders, and after a course of 100 m. falls into

the Scheldt at Ghent.

Lysander, famous Spartan commander, was a son of Aristocritus, of the royal Heraclid house. He became prominent first in the year 407 B.C. in the Peloponnesian war, when he was sent out as navarch, or com-mander of the fleet. His dip-lomatic abilities and his genius as a commander soon ended the war. In 406 B.C. Callicratidas succeeded him in the office of navarch, which the Spartan laws forbade the same man to hold twice. On the request of the Spartan allies, they sent him out nominally under the authority of a nonentity, Aracus, who was navarch, but really with full control of affairs; and that year he captured the whole Athenian fleet of 180 ships, with the exception of twenty, at Ægospotami. He then occupied Ægina, blockaded the Piræus, and in three months Athens surrendered. About 403 B.C. he seems to have formed an idea of changing the constitution of Sparta by making the monarchy elective instead of hereditary—of course with the view of obtaining it for himself; but he failed. Then he secured the appointment of Agesilauswho was, he thought, likely to prove a mere tool in his handsto the monarchy, on the death of Agis (398 B.C.); but Agesilaus at once asserted himself, and took command in Asia (396 B.C.). During the war with Thebes (395 B.C.) Lysander fell in battle before Haliartus. There is a Life of him by Plutarch, while Xeno-phon is the other chief ancient authority.

Lysias (c. 459-c. 380 B.C.), one of the ten Attic orators, was born at Athens, though he was not an Athenian citizen, his father, Cephalus, being a Syracusan. At the age of fifteen Lysias went to Thurii in Italy, and is there said to have studied rhetoric under Tisias (c. 412 B.C.). He returned to Athens, and there lived prosperously with his brother Polemarchus until 404 B.C., when their wealth attracted the attention of the Thirty Tyrants. Polemarchus was killed, while Lysias just escaped with his life, losing most of his fortune; retaining

enough, however, to aid in the restoration of the democracy (403 B.C.). He devoted the rest of his life to writing speeches for pay. He is said to have composed over two hundred speeches, thirtytwo nundred speeches, thirty-four being extant in whole or in part, of which all but two—and these two only in fragments—are court speeches. They are of great interest for the light which they throw upon Athenian legal procedure and the life of the time. and are remarkable for their perand are remarkable for their perfection of style. Editions—Text: Baiter and Sauppe (1850), Cobet (1863), Weidner (1888); with notes: Shuckburgh (1882), Kocks (1887), and Morgan (1895). See Jebb's Attic Orators (1876), and Mahaffy'a History of Classical Greck Literature (1880).



Lysimachia nummularia. 1, Calyx.

Lysimachia, a genus of flowering plants, order Primulaceæ. They are mostly natives of the northern temperate regions, but a few species are tropical. The flowers are usually characterized by a five-cleft calyx, a five-cleft rotate or funnel-shaped corolla, and a capsule opening by valves. The commonest British species is L. nummularia, the herb-two-pence, creeping jenny, or money-wort, which frequents damp, shady places, such as river banks and woods. The wood loosestrife, or yellow pimpernel, L. nemorum, is another common British species. usually found in woods.

Lysimachus (360-281 B.C.), one

of the generals of Alexander the Great, got the government of Thrace (323 B.C.), the title of king (306 B.C.), and with Seleucus defeated Antigonus at Ipsus (301 B.C.). In 291 a king of the Getæ took him prisoner, but soon re-stored him to liberty. In 287, with Pyrrhus, he expelled Demetrius from Macedonia, of which Pyrrhus became king; but in 286 Lysimachus drove him out, and assumed the monarchy. He fell in battle against Seleucus on the plain of Corus (281 B.C.). Arrian, Curtius, Diodorus, and Plutarch are the chief ancient authorities.

Lysippus, famous Greek sculptor, was a contemporary of Alexander the Great, who ordered that no one except Lysippus should carve his statue. His statues differed from those of his predecessors by their slenderer proportions and greater grace. His works are said to have numbered 1,500, nearly all in bronze.

None of them are extant. Lystra, city of Lycaonia, Asia Minor; famous chiefly from the fact that St. Paul and St. Barnabas preached there. See Wilson's Asia Minor (1895), and Ramsay's Historical Geography of Asia

Minor (1890).

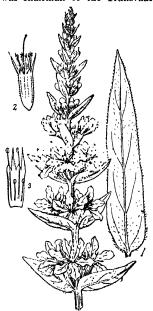
Lyte, HENRY FRANCIS (1793-1847), Scottish hymn-writer, born at Ednam, near Kelso. Lyte took holy orders, and, after holding several curacies, was appointed to the charge of Lower Brixham, where he officiated (1823 - 44). Among his best-known hymns are Abide with me, Pleasant are Thy courts above, and Praise, my soul, the King of Heaven. See his Remains, with Memoir (1850), and Carre's Border Memories (1876).

Lytham, par. and tn., Black-pool div., Lancashire, England, on riv. Ribble, 61 m. s.e. of Blackpool; is a favourite watering-place during spring and summer. At Lytham Pool, 1 m. N.E., are a graving dock and harbour. Pop. (1901) 7,185.

Lythraceæ, a natural order of plants, trees, herbs, and shrubs, most of which are natives of tropical America. The flowers are usually characterized by possessing a multipartite, tubular calyx, from the tube of which spring the stamens, a single style, and a many-seeded capsule. Among the genera are Lythrum, Grislea, Peplis, and Cuphea.

Lythrum (loosestrife), a genus of plants belonging to the order Lythraceae. They are characterized by having a cylindrical calyx with twelve parts, and a corolla of six petals. The commonest British species is L. salicaria, the purple loosestrife, which flowers in late summer, sending up great spikes of purple flowers. A less common species is L. hyssopifolia, the hyssop-leaved purple loose-strife, which is much smaller, and bears solitary flowers. Among the garden species are L. Græfferi, from the south of Europe, often grown in greenhouses as a hanging basket plant; and the hardy L. alatum, a North American species, with erect, brilliant purple flowers. Lyttelton, chief port of Canterbury, New Zealand, on N.W. of Banks Peninsula, on E. coast of South Island. The harbour, about 10 m. long and 2 m. wide, is enclosed by steep hills, the walls of an extinct volcano. The port, of an extinct volcano. The port, artificially formed by two semicircular breakwaters, encloses 107 acres, has a large graving dock, and the largest export trade for New Zealand. It is connected with Christchurch by a railway tunnelled through the hills. Pop. (1901) 4,023.

Lyttelton. ALFRED British statesman, was educated at Eton and at Trinity College, Cambridge, where he took honours in history and the oration prize. He was called to the bar (1881), took silk (1900), and was appointed successively recorder of Hereford (1894) and Oxford (1895). He represented Warwick and Leamington as a Liberal Unionist from 1895 to 1905, and St. George, Hanover Square, London, from 1906, for which he was elected at a bye-election; and is a member of the council of the bar. He was chairman of the Transvaal



Lythrum salicaria. 1, Lower leaf; 2, calyx; 3, section of part.

Concessions Commission, which held its inquiry in S. Africa during the latter part of 1900. From 1903-5 he was Secretary of State for the Colonies. A famous athlete, he has played both cricket and football for England, and was tennis champion (1882-95). Lyttelton, GEORGE, LORD (1709-73), English statesman, was educated at Eton and Oxford, and entered the House of Commons (1730) as an opponent of Walpole. Resigning his post as a lord of the Treasury (1754), he became a Privy Councillor, and in the following year Chancellor of the Exchequer, but resigned in 1756, when he was raised to the peerage. He published Observations on the Conversion and Apostleship of St. Paul (1747), and a History of Henry II. (1764), besides some poems. His Works were edited by Ayscough (1776). See also Phillemore's Memoirs and Correspondence of George Lord Luttlion (1845)

George, Lord Lyttelton (1845). Lyttelton, George William, FOURTH BARON (1817-76), was born in London, and educated at Eton and Cambridge. Deeply interested in the education of the working classes, he took an active part in the formation of the Birmingham Midland Institute, Saltley Training College, and in the formation of night schools. An-other of his special interests was the colonial empire of Great Britain, and he formed one of the 'Canterbury Association,' which settled the province of Canter-bury, New Zealand—the seaport Lyttelton there being named after him. Along with Mr. Gladstone he published a volume of translations into Latin and Greck (1839); he also printed several lectures on colonial matters. Among his sons are the Right Hon. Alfred Lyttelton (1857); the Hon. Canon Edward Lyttelton (1855), appointed headmaster of Eton College in 1905; and the Hon. George William Spencer Lyttelton (1847), formerly private secretary to Mr. Gladstone, and afterwards to Earl Granville.

Lyttelton, SIR NEVILLE GERALD (1845), British soldier, was educated at Eton. Joining the Rifle Brigade (1865), he served with that regiment in the Fenian rebellion in Canada (1866), in the Jowaki expedition (1877), and in the Egyptian campaign (1882), when he was present in the engagements at Tell-el-Mahuta, Kassassin, and Tell-el-Kebir. In the Sudan campaign, under Lord Kitchener (1898), he was in command of the 2nd Brigade, British division, and was engaged in the battle of Omdurman, or Khartum, when he was promoted to be major-gen-Lyttelton served throughout the Boer war, taking part in all the operations which finally resulted in the relief of Lady-smith (1900), including the battle of Colenso and of Vaal Krantz, which he captured and occupied. He was promoted lieutenantgeneral (1900), and created K.C.B. (1902). He was appointed commander-in-chief in S. Africa (1902). On the reorganization of the War Office he was made chief of the general staff (1914).

of the general staff (1904).
Lyttelton, Thomas, Lord (1744-79), politician, son of the first baron, entered the House of Lords (1774), and vigorously attacked the ministerial mismanagement of the American war, at the same time denouncing the opposition. The fulfilment of his mysterious death-warning by a dream of a dove and a white lady created a great sensation at the time. He published Poems by a Young Nobleman (1780). The Letters (1780-2) once ascribed to him were probably written by William Combe.

Lyttleton, SIR THOMAS.

See LITTLETON. Lytton, EDWARD GEORGE EARLE LYTTON BULWER, BARON LYTTON (1803-73), novelist, dramatist, and politician, was born in London, and educated at Cambridge, where he won the Chancellor's medal for poetry. The first work to bring him into prominence was his novel Pelham, published anonymously in 1828. This brilliant picture of contemporary life won him the fame that some early poems and a fantastic romance, Falkland (1827), had failed to do; and its success was continued by The Disowned (1829), Devereux (1829), Paul Clifford (1830), Eugene Aram (1832), and Godolphin (1833). In The Pilgrims of the Rhine (1834) he made a more successful essay in the romance of a quasi-German type of which Falkland had been a tentative example; and immediately afterwards, with The Last Days of Pompeii (1834) and Rienzi (1835), showed an unsus-pected power of sustaining human interest in archaeological and historical fiction. Ernest Maltravers (1837) and its sequel Alice (1838) were a return to the style of Pelham; and then for some years his versatility found a new outlet in the drama. Under Macready's management, and to some extent under his guidance, he had produced at Drury Lane a poetical play, The Duchess of La Vallière (1836), with but small success. This was now followed by The Lady of Lyons (1838), the only English poetical drama of the period which still holds the stage, Richelicu (1839), and his evergreen comedy Money at the Haymarket in 1840. Meantime he had achieved no mean reputation in the House of Commons, where he sat as Liberal member for St. Ives from 1831 to 1832, and for Lincoln from 1832 to 1841. He

eventually returned to Parliament in 1852 as a Conservative, and represented Hertfordshire till 1866, when he was raised to the peerage. The flow of fiction from his pen continued from 1841, its most popular examples being Zanoni (1842), The Last of the Barons (1843), Lucretia (1847), Harold (1848), The Caxtons (1849), My Novel (1853), What will he do with it? (1859), A Strange Story (1862), The Coming Race (1871), The Parisians (1873), and Kenelm Chillingly (1873). He published several volumes of verse. chief of these are two fairly successful satires, The New Timon (1846) and Saint Stephen's (1860); a romantic epic, King Arthur (1848-9); and The Lost Tales of Miletus (1866). His collected works were published in 37 vols. (1873-5); a Life of him by T. Cooper (1873); and an unfinished autobiography, edited by his son

Lytton, EDWARD ROBERT Lytton, EDWARD ROBERT BULWER, FIRST EARL LYTTON (1831-91), son of the preceding, statesman and poet, was born in London. He won a literary reputation by his poems under the pseudonym of 'Owen Meredith.' Previously to his succeeding (in 1873) to his factors title. ing (in 1873) to his father's title he was secretary of legation at various European capitals, and had published Clytemnestra (1855), The Wanderer (1859), Lucile (1860), Serbski Pesme (1861), The Ring of Amasis (1867), Chronicles and Characters (1867), Orval (1869), Fables in Song (1874). From 1874 to 1876 he was British ambassador at Lisbon, until his appointment as viceroy of India. His Indian administration was rendered notable by his diplomatic services in connection with the Afghan war, by his energetic campaign against famine, and by the proclamation of Queen Victoria as Empress of India. He was responsible for domestic reforms of a far-reaching character, particularly in fiscal matters and in the ordering of the civil service. He was created Earl of Lytton in 1880. After his return to England he published his father's unfinished biography (1883); Glenaveril, a narrative poem (1885); and After Paradise (1887). He was appointed (1887) ambassador at Paris, where he died suddenly. As a poet, his work is more distinguished by brilliancy than by any deeper quality. He is at his best in his lightest vein, as in Fables in Song, or the posthumously published King Poppy (1892). See Lady Betty Balfour's History of Lord Lutton's Indian Administration (1899).

M is the lip nasal; the mouth passage is closed by the lips, and the breath passes through the nostrils. It is closely related to n and ny. Final m shows a marked tendency to become silent in some languages; the history of the Latin accusatives supplies an illustration. The form M is more symmetrical than that of the early Semitic original. The variations m and \(\mu\) have been influenced by alteration in the point of commencement of the writing. The upper part of \(\mu\) corresponds to M; the lower curve is an addition (cf. \(\mu\) from \(\mu\). The Semitic m\(\mu\), \(\mu\), \(\mu\), \(\mu\), means "water."

M., a thousand (mille); marquess; member; monsieur.

M.A., Master of Arts.
Maal. See AASEN, IVAR.
Maertens, MAARTEN (1858),
pseudonym of Joost Marius Willem van der Poorten-Schwartz,
rowelist horn at Austerdam, and

novelist, born at Amsterdam, and educated partly in England. His first book, The Sin of Joost Avelingh (1889), brought him success as a delineator of Dutch



Maarten Maartens.
(Photo by Elliott & Fry.)

manners, and was followed by, amongst others, God's Fool (1893)—regarded as his best—An Old Maid's Love (1891), A Question of Taste (1892), The Greater Glorn (1894), My Lady Nobody (1895), Some Women I have known (1901), My Poor Relations (1903), Dorothea (1904), The Healers (1905), The Woman's Victory and Other Storics (1906). He has also written a one-act play, The Jailbird (1904). Mass. See MEUSE.

Maastricht, or Maestricht, tn., Netherlands, cap. of prov. Limburg, on l. bk. of Maas, 19 m. by rail N. by E. of Liège. The church of St. Servatius was founded in the 6th century. South of the town are the tuff quarries of Petersberg, quarried since Roman times; they have yielded many fossils, including saurians. Glass, pottery, and carpets are manufactured. Maastricht was, till 1871-8, one of the strongest fortresses in Europe, and was besieged by the Spaniards in 1576 and 1579, by the Prince of Orange in 1632, by the French in 1673, 1748, and 1794, and by the Belgians; capitulating in every case except the last. Pop. (1899) 34,220.

Mab. QUEEN, in the poets of the lith century, is queen of the fairies and consort of Oberon; but in Midsummer Night's Dream Shakespeare calls the queen of fairyland Titania. Drayton in his Nymphidia and Herrick in the Hesperides give this position to Mab. Compare Romeo and Julic (1.4). The being who presides in Shelley's poem of Queen Mab has very little in common with her.

Maba, a genus of tropical evergreen trees and shrubs belonging to the order Ebenacee. They usually bear diocious flowers, more or less campanulate in form. They are easily grown in a peaty compost in stove temperature.

Mabillon, Jean (1632-1707), French ecclesiastical historian, born at St. Pierremont (Ardennes), and entered the Benedictine order (1654). Out of a controversy with De Rancé, a Trappist, arose his Tratité des Etudes Monastiques (1691). But his chief works are De Re Diplomatica (1681), Acta Sanctorum Ordinis Benedicti (9 vols. 1668-1701), and Annales Ordinis Benedicti (6 vols. 1703-39). See E. de Broglie's Mabillon (1888).

Mabinogion, the collection of Welsh tales contained in The Red Book of Hergest, edited and translated into English by Lady Charlotte Guest (1839 49; newed. 1902). Four out of the twelve tales show a decided affinity with early Irish myth, and one of them, the story of Branwen, has been strongly affected by northern influences. These tales are non-Arthurian. There are five Arthurian stories contained in the collection; and of these, two -Kilhwch and Olwen and The Dream of Rhonabwy-have no parallel in continental Arthurian literature. other three-Geraint, The Lady of the Fountain, and Peredurcorrespond respectively to the Erec, Chevalier au Lion, and Perceval of Chrétien de Troyes. It has been authoritatively stated that the French poems were the direct source of the Welsh tales; it has been equally dogmatically affirmed that the Welsh tales are the direct source of the French poems. Probably the Welsh stories represent genuine popular versions of legends which had their origin on insular ground, and were redacted under the influence of the more elaborate and literary form due to Chrétien. The best translation is that into French by J. Loth (1889).

Mably, Gabriel Bonnot De (1709-85), French philosophical historian, born at Grenoble; forsook a Jesuit college to become (1742) secretary to Cardinal de Tencin, minister for foreign affairs to Louis XV.; but ere long he quarrelled with the cardinal, and retired. Previously a supporter of absolute monarchy, he now pleaded for simplicity and equality. Works: Entretiens de Phocion (1763); Parallèle des Romains et des Français (1740). See G. Guerrier's L'Abbé de Mably (1886).

Mabuse, JAN, properly YENNI GOSSAERT (c. 1470-c. 1537), a Flemish painter, was born at Maubeuge (Mabuse), and entered the painters' guild of St. Luke at Antwerp in 1503. His earlier pictures, such as the Adoration at Castle Howard, Yorkshire, are in the style of the early Flemish school. His visit to Italy (1508) first brought Flemish painting under the influence of Michael Angelo, Leonardo, and Raphael. Among his best-known works are St. Luke painting the Virgin, now at Prague; The Children of Christian 11. of Belgium, now at Hampton Court; Adam and Ere, now at Hampton Court; and everal Madonnas, in London, Paris, and Berlin.

Mac, a prefix in modern Irish and Gaelic signifying 'son,' as MacDonald, son of Donald. But there are numerous historical uses of the prefix in the sense of 'great,' evidently a corruption of the 'mag' in magnus. (See SCOTTISH CLANS.) Mac (abbrev. M° or M') has its equivalent in the Norman Fitz, the Irish O', and the Welsh Map or Ap.

M'Adam, John Loudon (1756-1836), inventor of the process of roadmaking known as 'mac-adamizing,' was born at Ayr, Scotland. In 1810 he made experiments in roadbuilding, and concluded that small, hard, broken stones should be used in layers gradually consolidated by the passage of traffic. At Bristol he put his theory into practice (1815), and (1827) was made general surveyor of roads, and granted £10,000. See Smiles's Lives of the Engineers, vol. iii. (1874).

M'All Mission (Mission Populaire Evangélique de France), founded in 1872 by Dr. R. W. M'All (1821-93), a Congregational minister in Paris. At M'All's death it had 136 centres in Paris and other towns, and auxiliaries in England, Scotland, and England, America.

Macao, seapt. tn., on a peninsula of Hiang-shan I., off the coast of Kwang-tung, China; has been a Portuguese possession since the 16th century, and is 8 m. in circuit. Portuguese sovereignty was not recognized by China until 1887. The trade has declined with the rise of Hong-kong. The imports amount to kong. The imports amount to about £1,500,000, and the exports (chiefly opium) to £1,250,000. The old Collegiate church of the Jesuits is the most striking architectural feature. The town is notorious for its gambling houses. Pop. (1896) 78,627.

Macaroni is a preparation of flour, usually made from hard Italian wheat. The flour is made into a thick paste, which is pressed through holes in metal plates, or stamped into various shapes, and heated and dried. Macaroni is highly nutritious, being formed chiefly of gluten. In cooking macaroni, it must not be soaked or even washed with water be-forehand, but must in all cases be plunged into water which is absolutely boiling. Plenty of water should be allowed-a gallon to a pound of macaroni -and this should be liberally salted. It requires to be boiled from twenty to thirty minutes. Mrs. Janet Ross, in her Leaves from our Tuscan Kitchen (1899), gives interesting recipes.

Macaroni, a London dandy of the 18th century; a member of the Macaroni Club, which sought to introduce foppish elegancies in dress and bearing.

Macaronic Verse, verse composed partly in Latin and partly in words taken from other languages with Latin terminations added, as in Burke's hexameter, 'Piper erat fattus, qui tegmen brownum habebat' ('There was a fat piper who had a brown coat'). The Benedictine Teofilo Folengo (otherwise Martin Cocai) first used it on a large scale in his Maccaronea (1517). Drummond of Hawthornden's Polemo-Mid-dinia (1683) is the best known example in English. See Sandys's Specimens of Macaronia Poetry (1831), Delapierre's Littérature Macaronia (1856), Morgan's Macaronia Poetry (1872), and Blümlein's Macaronische Gedichte (1900).

Macarsca, or Makarskar, seapt. in Dalmatia, Austria, 38 m. E.S.E. of Spalato, opposite Brazza; is noted for wine. Pop. (1900)

11,016.

Macartney, George, First Earl of (1737-1806), British administrator and diplomatist; was Chief Secretary for Ireland (1769-72); governor of Caribbean Is. (1775-9), of Madras (1780-6), and of the Cape of Good Hope (1796-98). He was special envoy to St. Petersburg, and concluded a commercial treaty (1764); plenipotentiary to China (1792-94); and went to Italy (1795). See Life by Sir John Barrow (1807).

Macartney, SIR HALLIDAY (1833-1906), born at Dundrennan, Kirkeudbrightshire, Scotland. After serving (1856) in the Crimea, and in the Chinese war (1860). when he was present at the storming of the Taku forts, he in 1862 helped General Gordon to quell the Taiping rebellion, and was director of a military arsenal at Nanking (1861-76). After that he became English secretary to the Chinese legation in London.

Macassar, fort. seapt., Celebes, Dutch E. Indies, on s.w. coast; exports rice, coffee, rubber, tortoiseshell and pearls, cocoa oil, and Macassar oil. Its total trade is about £1,500,000 annually. Pop. 18,000.

Macaulay, Thomas Babing-

TON, FIRST BARON (1800-59), English historian, born at Rothley Temple, Leicestershire, was the son of Zachary Macaulay, whose name is associated with the abolition of slavery in the W. Indies. Between 1823 and 1824 he wrote frequently for Knight's Quarterly Magazine—c.g. the poems 'Ivry' and 'Naseby;' and in 1825 he began to contribute his famous essays to the Edinburgh Review. In 1828 he was made a com-missioner of bankruptcy, holding the office until it was abolished three or four years later. In 1830 he was elected to Parliament for Calne. His first speech on the Reform Bill (March 1831) put him in the front rank of orators. His appointment first as commissioner, then as secretary, of the Board of Control, followed in 1832. Friendship's Offering for 1833 contained his spirited poem 'The Armada.' In 1833 he accepted the post of legal adviser to the Supreme Council of India. After his return home he was elected M.P. for Edinburgh in 1839, and soon afterwards entoring the cabinot as Secretary of State for War. The Lays of Ancient Rome were published in 1842. But three published in 1842. years before, he had begun The History of England from the Accession of James II. On the return of the Whigs to power in 1846 he again entered the cabinet, as Paymaster-general of the Forces. His rejection by Edinburgh in the following year, on account of his support of the Maynooth grant, practically closed his political career. November 1848

saw the publication of the first two volumes of his History. Thirteen thousand copies were bought up in less than four months after publication. Between 1853 and 1859 he contributed a series of masterly biographies to the eighth dition of the Encyclopædia Britannica. The third and fourth volumes of his History were given to the world in 1855. A posthumous volume, bringing it down to the death of William III., was edited by his sister, Lady Trevelyan, in 1861. Macaulay was buried in Poets' Corner, Westminster Abbey. As a historian, Macaulay has

been justly charged with want of accuracy. His Whig propen-



Lord Macaulay.

sities and a love of sweeping statements led him at times to disregard strict justice. On the other hand, he succeeded in his aim of making history as interesting as a novel. He has also the merit of having introduced a new style into English literature. In all his writings he exhibits a power of picturesque narrative and a wealth of allusion which have never been surpassed.

Works, ed. by Lady Trevelyan (8 vols. 1866); History of England, with Memoir by Milman (8 vols. 1858-62); Speeches (1854); Miscellaneous Writings, ed. by Ellis (2 vols. 1860); Selections, ed. by G. O. Trevelyan (1876). See Life, by G. O. Trevelyan (2 vols. 1876), Morison (English Men of Letters, 1882), D. H. Maggregor (1901), and Jebb (1900); and Public Life, by Arnold (1862).

Macaw, the name of certain South American parrots, belonging to the genus Ara, and to other related genera. All are gorgeously coloured, and possess a peculiarly harsh and screaming voice. They are of large size.

Macaw Tree (Acrocomia selerocarpa), also called GRU-GRU, a palm, native to S. America and the W. Indies. It bears pinnate leaves, twelve feet and more in length, and its fruit yields an oil largely imported into Britain as palm oil, and much used in soap manufacture.

Macbeth, mormaer of Moray, having murdered Duncan, king of the Scots, near Elgin (1040), succeeded to the throne. Duncan's son, Malcolm, who fled to England, invaded Scotland, routed (1057) Macbeth, and killed him at Lumphanan in Abordeenshire. See Robertson's Scotland under her Early Kings.

Maccabees, a famous Jewish family, descendants of Mattathias, though the more accurate term for the family is Hasmonæans or Asmonæans, derived from Hashmon, the name of the great-grandfather of Mattathias. See further under ISRAEL.

Maccabees, Books of the. Of the five apocryphal writings embraced under this name, two (I. and II. Macc.) are accepted as canonical by the Roman Cath-olic Church. (1.) 1. MACCABEES deals with the period 175-135 P.C., and narrates the origin and progress of the Jewish revolt against Syria, and the exploits of Judas, Jonathan, and Simon. It was written in Hebrew, probably early in the 1st century B.C. and shortly afterwards translated into Greek. Its truly religious, while very reserved, spirit gives it every appearance of general trustworthiness. (2.) II. MACCA-BEES begins its history one year previous to that of 1. Maccabees, but covers only fifteen years. It adds little of value to our know-ledge. Its Greek is pure, but the work is full of bigotry and of the marvellous, and was written, probably by a Pharisee, about the beginning of the Christian era. III. MACCABEES relates two incidents -viz. Ptolemy IV. Philopator's attempt to descerate the sanctuary (217 B.C.), and his attempt to destroy the Jews. The work bears evidence of having been written (in Greek) by an Alexandrian Jew. IV. MACCABEES has for its theme 'the supremacy of pious reason over the passions, and is a philosophical prelection, influenced by Greek thought, especially Stoicism, and illustrated from Maccabean history as found in II. Maccabees. The book has been attributed, on quite inadequate grounds, to Josephus, and is generally assigned to the 1st Christian century. V. MAC-CABEES contains a summary of Jewish history covering practically the last two centuries B.C., and has been compiled from I. and II. Maccabees and Josephus. See Grimm's Commentary on I.,

II., III., and IV. Maccabees (1853-57); I. and II. in Speaker's Com. (Rawlinson); I. in Camb. Bible; Cotton's The Five Books of the Maccabees in English (1832).

MacCarthy, Denis Florence (1817-82), Irish poet, born in Dublin. He wrote poems for the Nation and the Irish Catholic Mayazine (1845). In 1864 he settled in London, but died at Blackrock, near Dublin. Works: Poems (collected 1850 and 1884); Ode on the Centenary of Thomas Moore (1880). Translations—from the Spanish of Calderon—Justina (1848); Lore (1861); Mysteries of Corpus Christi (1867).

M'Carthy, JUSTIN (1830), Irish novelist, journalist, and politician, was born at Cork; was reporter for Morning Star (1860), subsequently editor (1864-8). Since 1870 he has been leader writer on the Daily News, Of novels he has published nearly a score e.g. Dear Lady Disdain (1875), The Dictator (1893), four in collaboration with Mrs. Campbell-Pracd, and a volume of essays, Con Amore (1868). He has also written lives of Sir Robert Pect (1890), Gladstone (1898), Leo XIII. (1895), and A History of Our Own Times (1882 -97 and 1905), his chief work; also A History of the Four Georges and William IV. (1884-1901), Epoch of Reform (1874), Modern England (1899), Reign of Queen Anne (1902), and Portraits of the 'Sixties (1904). An Irish M.P. for seventeen years (Co. Longford, Londonderry, N. Longford), he was chairman of the Home Rule party (1890 6).See his own Reminis-

cences (1899).

M'Carthy, Justin Huntly (1860), dramatist, novelist, and historian, son of the preceding, has travelled much in Europe, Egypt, Palestine, and the United States. His publications include A History of England under Gladstone (1885); Sketches of Irish History (1887); Lady of Loyalty House (1904); Dryad (1905); translations of the Rubaiyat of Omar Khayyam, and The Thomsand and One Days; and several plays.

M'Cheyne, ROBERT MURRAY (1813-43), Scottish divine, was born in Edinburgh. An account of a journey to Palestine was embodied by M'Cheyne and Andrew Bonar in the Narrative of a Mission of Inquiry to the Jews (1842). See Memoirs and Remains, by Andrew Bonar (1843 and 1892); and Life by Jean L. Watson (1882).

Macchiavelli. See MACHIA-

M'Clellan, GEORGE BRINTON (1826-85), American general, was born at Philadelphia. He served in the Mexican war (1847); was instructor at West Point, explorer of Red River and Texas, and finally (1855) sent to ob-

serve the Crimean war, of which he published a brilliant report (1861), The Armies of Europe, Joining the North on the outbreak of the civil war, he won over W. Virginia; then he organized the army of the Potomac, with which he took Yorktown (1862) and threatened Richmond. He was forced back by Lee in the 'seven days' battles,' but finally defeated Lee at Antietam (1862). After that Lincoln relieved him of the chief command, and in 1864 he resigned. See M'Clellen's Orn Story (1886) and Michie's Life of General M'Clellan (1901).

Macclesfield, munic. bor. in Cheshire, England, 12 m. S.S.E. of Stockport; chief silk-manufacturing centre in England, producing brocades, plain and fancy silks and satins, ribbons, gimps, and fringes. Silk-throwing is an important branch of the industry. Pop. (1901) 34,624.

try. Pop. (1901) 33,022.

M'Clintock, SIR FRANCIS LEOPOLD (1819), British admiral and
Arctic explorer, born at Dundalk,
Ireland. He served in four Arctic
expeditions. The second (1850)
found traces of Franklin; the
third (1852) relieved the M'Clure
expedition; the fourth (1857) ascertained the fate of Franklin.
In 1859 he published The Fate of
Sir John Franklin.

M'Clure, SIR ROBERT JOHN LE MESURIER (1807 73), British vice-admiral, born at Wexford, Ireland. He served in Arctic expeditions under Back and Ross (1836-7), commanded the Franklin search expedition of 1850, and accomplished the North-west Passage (1851).

M'Clure, SAMUEL SIDNEY, (1857), American publisher, was born at Frocess, Co. Antrim, Ireland. He became (1882) editor of the Wheelman (Boston), and in 1884 established in New York the first newspaper syndicate, and in 1899 the M'Clure Phillips company of publishers. In 1893 he began M'Clure's Magazine.

m'Clure's Magazine. American monthly periodical. The Life of Napoleon and Life of Lincoln, published in M'Clure's, created great public interest; while Miss Tarbell's 'History of the Standard Oil Company' has been another important enterprise of this magazine. Among its contributors have been Robert Louis Stevenson, Dean Farrar, 'Anthony Hope,' Henry Drummond, Elizabeth Stuart Phelps, Rudyard Kipling, and J. M. Barric; and Stephen Crane was one of the writers whom M'Clure's 'discovered.'

MacColl, MALCOLM (1838), Scottish divine, was born at Glenfinnan, Inverness. He was chaplain to the British embassy in St. Petersburg (1862-3), rector of St. George's, London, and in 1884 canon of Ripon. He is the author of Is there not a Cause? (1868) The Eastern Question (1877) Reasons for Home Rule (1886) and The Ober-Ammergan Passion

Play (1870).

MacCormac, SIR WILLIAM, (1836-1901), Irish surgeon, was born in Dublin. He was con-He was consulting surgeon in Belfast Royal Hospital, then surgeon-in-chief to the Anglo-American ambulance during the Franco-German war (1870-1), and later lecturer at St. Thomas's, London, and consulting surgeon to the French Hospital. He was an authority on gunshot wounds. He saw active service in Cape Colony and Natal (1899-1900), and in 1901 was appointed sergeant-surgeon to the king. Publications: Antiseptic Surgery (1880), Notes and Recollections of an Ambu-lance Surgeon (1880), Hernia (1886), and Surgical Operations (1885-9.

M'Cormick, Cyrus Hall (1809-84), American inventor, was born at Walnut Grove, Virginia. His reaping machine, first used in 1831, was perfected and pat-

m 1831, was personal and personal in 1834.

M*Cosh, James (1811-94), Scottish philosopher, born at 1835. Carskeoch, Ayrshire. In 1835 he became minister at Arbroath, removing (1838) to Brechin, and helping to organize the Free Church of Scotland (1843). At Brechin he published his Method of the Divine Government, Physical and Moral (1850), which won him the professorship of logic at Queen's College, Belfast. In at Queen's Contege, Deniass. In 1868 he was made president of Princeton College, New Jersey, resigning (1888). His Examina-tion of Mr. J. S. Mill's Philos-ophy (1866), Realistic Philosophy (1897). Emphylamon Lis Metics (1887), Psychology of the Motive Powers (1887), and First and Fundamental Truths (1889) are written from the standpoint of

the Scottish intuitional school.

M'Crie, THOMAS (1772 1835), Scottish preacher and ecclesiastical historian, was born at Duns, Berwickshire. Becoming a minister of the Church of Scotland, he opposed the effort to dissociate the church from the civil authority. He wrote accounts of the reforming movements in Scotland, in Italy (1827), and in Spain (1829). The first of these, cast in the form of the Life of John Knox (1812), is still a standard book. The special value of M'Crie's work lay in his im-partiality, and in his wide grasp of the principles underlying the reformation period. See Life by his son (1840), also Memoir by Crichton (1854).

M'Culloch, HORATIO (1805-67), Scottish landscape painter, was born at Glasgow; at first decorated snuff-boxes and illustrated

books. In 1829 he exhibited a View on the Clyde, and in 1836 became an A.R.S.A., and in 1838 an R.S.A. Chief pictures: Loch-an-Eilan; Inverlochy Castle; Ben Venue; Moonlight—Deer Startled;

Mist Rising off the Mountains.
M'Culloch, SIR JAMES (1819-93), colonial politician, was born in Glasgow, and settled in Melbourne, Australia. He was four times prime minister of Victoria (1863-8, 1868-9, 1870-1, and 1875-77); passed a land bill, and introduced a protective tariff.

MacCulloch, JOHN (1773-1835), British geologist, was born in Guernsey. His principal work is System of Geology (1831). He specialized in the geology of Scotland, drawing up a Geolog-

ical Map of Scotland (1836).

M'Culloch, John Ramsay (1789-1864), Scottish statistician and political economist, was born at Whithorn, Wigtownshire. He delivered lectures in London (1824), afterwards embodied in Principles of Political Economy (1825), a standard work of the day. M Culloch was an ardent disciple of Ricardo and Adam Smith, whose works he edited. But he was a wellinformed and accurate compiler rather than an original contributor to economic science. See biographical notice by Reid, prefixed to Dictionary of Commerce (1869).

MacCunn, Hamish (1868), Scottish musical composer, born at Greenock. In 1886 his over-ture, Land of the Mountain and the Flood, was produced at the Crystal Palace, He was professor of harmony (1888-94) at the Royal Academy of Music, and (1892) conductor of the Hamp-stead Conservatoire Orchestral Society. His chief works are: - Operas-Jeanic Deans (Edinburgh, 1894), Diarmid, libretto by Mar-18:H), Diarmita, infection by managuis of Lorne (18:96); cantatas— Lord Ullin's Daughter, Queen Hynde of Caledon; besides nu-merous overtures, songs, part songs, Scottish dances, and pieces for 'cello and pianoforte.

Macdonald, SIR CLAUDE MAX-WELL (1852), British soldier and diplomatist, served in Egypt (1882) and in the Suakin expedition (1884-5), and was wounded at Tamai. From 1896-1900 he was minister at Peking, and commanded the legation quarters when besieged by the Boxers (1900). He was then appointed British minister to Japan, and in 1905 first ambassador to that country

MacDonald, ETIENNE JACQUES Joseph Alexandre (1765-1840), Duke of Taranto and marshal of France, near relative of Flora MacDonald, was born at Sancerre (Cher). Crossing the Waal on the ice, he captured the Dutch

fleet-a feat unique in history (1794-5). He saved the situation in Italy, fighting Suvarov for three days till relieved by Moreau (1799). In 1800 he swept the Austrians before him in the Splügen, but in 1804-9 was in disgrace through defending Moreau. However, he broke the Austrian centre at Wagram (1809), for which he was made marshal. Defeated by Blücher on the Katzbach (1813), he fought orandly at Leipzig. See Sougrandly at Leipzig. See Souvenirs du Maréchal MacDonald, ed. by Rousset (1892).

MacDonald, FLORA (1722-90),

Scottish heroine, was born at Milton, S. Uist. At Benbecula, Hebrides (1746), when Charles Edward arrived after Culloden, she obtained a passport for her-self, man-servant, 'Betty Burke, an Irish spinning-maid' (i.e. the prince), and landed the Pretender at Kilbride, near Monkstadt, whence he gained Portree and Raasay House, eventually escaping to Brittany from Borradale. For this she was imprisoned in the Tower of London, but was pardoned (1747). See *Life* by Macgregor (new ed. 1901), and Jolly's Flora MacDonald (1886).



George MacDonald. (Photo by Elliott & Fry.)

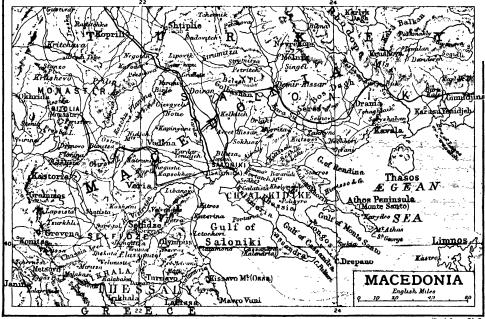
MacDonald, George (1824-1905), Scottish novelist and poet, born at Huntly, Aberdeenshire. After a sojourn in London his weak health constrained him to settle at Bordighera in Italy. Dr. MacDonald published Poems (1857), and the striking Phantastes, a Faerie Romance (1858). His knowledge of the north of Scotland is conspicuous in the novels David Elginbrod (1862), Alec Forbes of Howglen (1865), Robert Falconer (1868), Malcolm (1875), and The Marquis of Lossie (1877). Others are Annals of a Quiet Neighbourhood (1866); Guild Court (1867); Wilfred

Cumbermede (1871); St. George and St. Michael (1875); Thomas Wingfold, Curate (1876). Tho author's dogmatism, often painfully persistent, occasionally intensifies the intrinsic interest of his problem, as in Lillich (1895). His children's poems and stories are popular. See Johnson's George Macdonald (1995).

Macdonald, SIR HECTOR ARCHIBALO (1852–1903). British soldier, was born in Ross-shire, Scotland. Enlisting as a private, he saw service in the Afghan war (1879-80), and was promoted from the ranks. In 1881 he served in the Boer war, and was present at Majuba Hill. Between 1885 and 1898 he took part in most of the Egyptian Sudan campaigns, being

Macdonald, John (1779-1849), 'Macdonald, John (1779-1849), 'Apostle of the North,' was born at Reay, Caithness. He preached in the Highlands until his appointment to the Gaelic chapel, Edinburgh (1807); and while parish minister of Urquhart, Ross-shire (1813-43), he did mission work in Ross, Cromarty, St. Kilda, and Ireland. At the Disruption of 1843 he joined the Free Church. See Diary of Visits to St. Kilda (1830), and Gaetic Verses (1848).

Macdonald, SIR JOHN ALEX-ANDER (1815-91), Canadian statesman, was born in Glasgow, but was taken to Canadian 1820. He entered the Canadian House of Assembly in 1844, and in 1856 became leader of the Conservative record extending from 1865 to 1902, when he returned to England and became a member of the India Council. In September 1902 he was 'lent' by the Secretary of State for India, and although a Roman Catholic, a Liberal, and a Home Ruler, was appointed under-secretary for Ireland by the then Unionist Government. His activity in furthering 'devolution' provoked the resentment of the Ulster members, and culminated in the resignation of Mr.)Wyndham, Chief Secretary for Ireland. Under the Liberal government it is expected that Sir Antony MacDonnell will have scope for working out the principle of ruling Ireland according to Irish ideas.



Bartholomew, Educ.

present at the battles of Toski, Tokar, Abu-Hamed, Atbara, and Omdurman, in the last of which he especially distinguished himself. After the death of General Wauchope at Magersfontein (Dec. 11, 1899), Macdonald was given the command of the Highland Brigade. He was engaged in the operations that led to the capture of Cronie and his force at Paardeberg (Feb. 27, 1900). He commanded the Southern and Belgaum district, India (1901), and in 1902 was transferred to Ceylon. He subsequently committed suicide in Paris. A national monument to his memory has been erected at Dingwall.

party, and premier. Macdonald was an advocate of the federation of the British North American colonies, and he triumphed in 1867, when the Dominion of Canada was created, he being its first premier. He held office till 1873, and came back into power in 1878 as a protectionist, and remained in power till his death. See Life by J. Pope (1894).

See Life by J. Pope (1894).

Macdonald, Sir John Hay
Athole. See Kingsburgh.

MacDonnell, SIR ANTONY PATRICK, P.O. (1902), G.C.S.I. (1897), K.C.V.O. (1903), under-secretary to lord-lieutenant of Ireland, born 1844, is a distinguished civil servant with a brilliant Indian

M'Dougall, William (1822-1905), Canadian statesman, was born at Toronto. He was minister of public works (1867); puisne judge in the province of Quebec (1887); and promoted the union of British N. America.

M'Dowell, Invin (1818-85), American general, was born at Columbus, Ohio. In the civil war he commanded the Federal troops when defeated at Bull Run (1861), and was retired from active service (1862). He was afterwards acquitted of blame by a court of inquiry, and in 1865 was appointed major-general.

Macduff, Thane or Earl of Fife, who, according to tradition,

succeeded in defeating Macbeth at the battle of Lumphanan (1057), and assisted in placing Malcolm Canmore on the throne. See Shakespeare's Macbeth.

Mace, an ornamental which certain judges, magistrates, and high official persons, such as the Lord Chancellor and the speaker of the House of Com-mons, are entitled to have borne before them as a symbol of authority. In 1354 Edward III. thority. In 1354 Edward III. granted to the city of London the right to have maces of gold or silver, or silvered or garnished with the sign of the royal arms, borne before the lord mayor. As to the speaker's mace, Sir Erskine May says: 'The present mace dates from the restoration of Charles II., when a new mace was ordered May 21, 1660. After the death of Charles I., in 1649, a new mace had been made, which was the celebrated "bauble" taken away by Cromwell's order on April 19, 1653, and restored on the 8th July of the same year.' - Parliamentary Practice, 9th ed., p. 152, note.

Mace, the large branched aril of the nutmeg, is of a deep orango or scarlet colour, and of a fleshy consistence when fresh. It is commonly sold in the dry state, when it takes on a dull yellowish colour. It contains about 8 per

cent. of oil of nutmeg. Mace, JEM (1831), English pugilist, born at Swozzham, Norfolk; forms a link between the old prize-fighters and the modern exponents of glove contests. His first fight was in 1855. In January 1862 Mace defeated Tom King, but was himself subsequently

beaten by King. Macedonia, or MACEDON, country to the N. of ancient Greece. On the accession of Philip (359 B.C.) it reached down to Mt. Olympus in Thessaly. The inhabitants were no doubt of Greek race, and their kings claimed descent from the royal family of Argos; but the Greeks regarded them as an alien people. The monarchy was weak until Philip became king. The secret Philip became king. of his success was his organization of a regular standing army. From his time until its conquest by Rome (168 B.C.) Macedonian history is part of that of Greece. The Macedonians were a vigorous, warlike race; like other northern nations, they were hard drinkers. Macedonia has become notorious in recent years as the scene of revolts against Turkish rule. The Congress of Berlin in 1878 made certain stipulations as to autonomous institutions for the Macedonian Christians. In 1875 the Bulgarians fomented a revolt, and their government proposed a plan of reform. In 1896, and again in 1903, constant conflicts with the Turkish soldiery took place. In December 1905 the powers made a naval demonstration against Turkey to enforce their scheme of financial control in Macedonia. See Brailsford's Macedonia, its Races and their Future (1906), and EASTERN QUESTION.

Maceio, cap. of Alagoas, Brazil, 125 m. s.s.w. of Pernambuco, at a short distance from its port, Jaragua, on the Lagoa do Norte. There are cotton and sugar mills.

Pop. 30,000.

Macerata, tn., cap. of prov. of same name, Italy, 22 m. s.w. of Ancona. Its cathedral and university date from 1290. The chief manufactures are glass, pottery, and chemicals. (1901) 22,473. Pop.

Macewen, SIR WILLIAM (1848), Scottish physician, was born in Bute. He was for some years lecturer on surgery at the Royal Infirmary School of Medicine, Glasgow, and since 1892 has been professor of surgery at Glasgow University. His speciality is operations on the brain. principal works are Ostcotomy (1880), and Discases of the Brain and Spinal Cord (1893).

Macfarren, SIR GEORGE ALEXANDER (1813-87), English musical composer and writer, born at London. He became professor of the Royal Academy of Music (1837), and principal (1876). In 1875 he was appointed professor of music at Cambridge University. In 1830 he produced his first important orchestral work, a symphony. Chevy Chase (written in one night, 1836) was produced at Leipzig by Mendelssohn (1843); May Day (cantata) in 1857, Costa conducting; Robin Hood, his greatest opera, in 1860, in which year he became blind. His first oratorio was St. John the Baptist, performed 1873. He was founder of the Handel Society (1811). He wrote on harmony and counterpoint, and Musical History (1885). See Life by Banister (1891-2).

MacGillicuddy's Reeks, mts., Co. Kerry, Ireland, on shores of Lakes of Killarney. The principal peak is Carntual or Carran-tuchill (3,414 ft.), the loftiest

peak in Ireland.

Macgillivray, James Pitten-dreigh (1856), Scottish sculptor and artist, born at Port Elphinstone in Aberdeenshire; studied under Brodie. He worked for some time at ornamental moulding and at painting, but since 1883 has devoted himself to sculpture. His works include a statue of Burns for Irvine; John Knox Memorial, St. Giles's Church, Edinburgh; portrait busts of Thomas

Carlyle, David Masson, etc.

MacGillivray, WILLIAM (1796-1852), Scottish naturalist,

was born at Old Aberdeen, and was successively assistant to the professor of natural history at Edinburgh (1823), curator of the Royal College of Surgeons (1831-41), and professor of natural history and lecturer on botany at Marischal College, Aberdeen (1841). He is best known for his History of British Birds (1837-52).

M'Gill University, Canada, was founded (1821) on the endowment of James M'Gill, at Montreal. The enlightened administration of Sir William Dawson raised it during the last quarter of the 19th century to a

commanding position.

MacGregor, John (1825-92), Scottish traveller and phi-lanthropist, known as 'Rob Roy MacGregor.' From 1865 he navi-gated in his Rob Roy cance sevgated in its Acor Roy cance several rivers of France, Germany, Norway, and Sweden, besides travelling down the Red Sea and through part of Palestine, and wrote A Thousand Miles in the Rob Roy Canoe (1866). Mac-Gregor took an active part in the schemes of Lord Shaftesbury and other philanthropic efforts. See Life by Hodder (1894).

M'Gregor, ROBERT. See ROB

M'Guckin, Barton (1853), tenor vocalist, a native of Dublin, was in 1871 first tenor at St. Patrick's Cathedral there. As a concert singer he sang at Dublin and at the Crystal Palaco, London. He sang at festivals at Hereford and Bristol (1879), at Norwich (1881), and at Leeds (1886). From 1880 (when he began opera singing as Thaddeus in the Bohemian (firl) till 1896 he was a member of the Carl Rosa Opera Company.

Machærodus, a formidable carnivorous animal, with canine teeth from eight to twelve inches in length, larger than those of any other known animal. It was contemporaneous with cave-man in the south of England, and it is well represented in Pleisto-cene strata all over Europe and America. It appears to have been about the same size as the lion.

Machiavelli, or MACCHIAVELLI, NICCOLO (1469-1527), Italian writer, was born at Florence. He entered the service of the republic in 1493, as secretary of the Ten. He went on a mission to Casar Borgia, the lord of Romagna (1502-3). The victory of the Medici party brought about his dismissal (1512). He was suspected of having taken part in the conspiracy of Boscoli and Caponi, and was imprisoned for a while (1513). In 1519 he gained the favour of the Medici, who conferred some minor posts on him, which he held while writing the Istoric Fiorentine. Three of Machiavelli's great

works may be said to supplement each other. The Principe (1532) deals with the founding of a new state, and suggests as model the duchy of Romagna, as founded and governed by Casar Borgia. Machiavelli's own political ideal was a republic such as Rome had been, and in the Discorsi sopra la Prima Deca di T. Livio (1531) he uses Livy as a peg on which to hang and by which to illustrate his own favourite theories. Arte della Guerra (1521) upholds the idea of an armed people, and of the infantry as the main strength of the army, thus again going back to Rome and her legions as a model. The Istoric Fiorentine (1531) treats of the history of Florence from early times down to the death of Lorenzo de' Medici (1492) in a way that is neither strikingly original nor scientifically accurate. Among the works of smaller compass the Mandragola (1513) stands first as a brilliant comedy of manners. Others (published at Florence in 1545) include the Asino d'oro (after Apulcius), the novel of Belfagor (a satire on matrimony), the Decennali (a sketch in verse of contemporary events), and the Capitoli (elegiae poems, moral in tone). Machiavelli's Works were rendered by E. Farneworth (1762), the chief prose works by C. E. Detmold (1882), and by Whitehorne, Dacres, and Bedingfield (2 vols. 1906). All the biographics were supplanted by Villari's masterly Niccolo Machiavelli e i suoi Tempi (1st ed. 1877; 2nd ed. 1895-96; Eng. trans. 1878; popular ed. of same, 1904). English students should consult Macaulay's essay (1827), Lord Acton's Introduction to Burd's ed. of the Principe (1891), and John Morley's Romanes Lecture (1897).

Machine Construction. Cast iron enters most largely into the construction of machines, being the cheapest and most effective material for heavy and bulky parts, such as bed-plates and frames, for cylinders, pump casings and valve-boxes, and, generally speaking, for all positions which require strength rather than toughness. Wrought iron and steel are essential for shafting, connecting and piston rods, and all parts subject to heavy tensile and transverse stresses. Brass or gun-metal is used for bearings and other surfaces exposed to heavy friction. Cast iron and brass receive their rough form by founding-i.e. by running the molten metal into moulds of the requisite shape. (See Cast). The wrought-iron members of machinery are forged, small pieces by the smith, large parts under a heavy steam-hammer. The latter are built up of successive layers of white-hot scrap iron,

and welded into one homogeneous whole by reheating and continuous hammering. Steel forgings are worked in a similar manner, being, however, formed from one solid ingot, instead of built up of a number of pieces. The hammering process is equally necessary in the case of steel, in order to ensure the complete elimination of blow-holes, which are usually present in the ingot. See Lincham's Mechanical Engineering (1894); Rose's Complete Practical Machinist (1895); and Cryer and Jordan's Machine Construction (6th ed. 1896).

Machine Guns. See Guns. Machines, Automatic. A large number of machines may be termed automatic in that, being set in motion, with an adequate supply of motive power they perform a series of operations without further intervention from the man in charge. Wood-working and metal-shaping machines, for instance, turn out in a practically finished state articles of often intricate shape- the man in charge having only to place the piece of wood or metal in position, adjust and oil the machine, apply and shut off the power. Various types of conveyors work automatically on a larger scale and through a wider series Coal-conveyors, of operations. for example, sort, clean, and distribute the coal by means of a series of travelling belts and endless chains of reversible buckets, without any intermediate adjustment by hand. Weighing appliances, however, afford the most perfect examples of automatic machines, as in them no external power is required, and no supervision needed after the first adiustment. Automatic weighing machines separate a constant supply of material into a succession of equal weights, at the same time registering the number of weighings, so that an absolute record is obtained of the amount of material passed through. They are designed to weigh out powders in ounces, coffee or peas in pounds, grain in cwts. or tons, and coal in still larger quantities, at a rate of from twenty to two lots a minute, according to the class of material. Their construction is simple, the action depending on the regular flow of the material to be weighed into a hopper, which discharges its contents through the bottom as soon as their weight balances that of a counterweight on a long-armed beam. On a smaller scale automatic machines afford a ready means of supplying small articles without the expense of an attendant. Somewhat the same balance principle is adopted, the introduction of a coin (which also serves as payment) releasing a

catch, and allowing the drawer or other receptacle for the article in question to be pulled out, or setting free for action some simple mechanism, as that of a light weighing machine, a lock, or the controlling spring of an electric light. In the American Senate votes are recorded by an automatic contrivance fixed into the desk of each senator, and a similar device has been suggested for registering the votes at elections. Another application of the balance principle is that of the automatic change machine, from which silver can be extracted equal only in value to the amount of gold inserted into the slots.

Machines, Hydraulic. See Hydraulic Machinery.

M'Ilwraith, Sir Thomas (1835-1900), Australian statesman, was born at Ayr, Scotland. He emigrated to Victoria (1854) as a railway engineer. In 1874 he entered political life in Queensland. During his first premiership (1879-83) he annexed New Guinea to Queensland. After resigning a second premiership (1888) he joined Sir Samuel Griffith's ministry, and in 1893 was again premier. In 1895 he retired in ill-health to England.

Macintosh, Charles (1766-1843), Scottish chemist, born in Glasgow. While trying to utilize the coal-naphtha given off in distilling tar, he discovered a process of dissolving india-rubber and waterproofing cloth. He patented the invention in 1823.

Macintyre, Margaret, operatic singer, was born in India. Her first important concert was in Edinburgh in 1888. She sang soprano in Liszt's oratorio of Elizabeth, was Michaela in Carmen (1888), and later Rebecca in Iranhor. In 1891 she took part in the Handel festival.

Mack, Karl, Freiherr Mack Von Leiberich (1752-1828), born at Nennslingen in Franconia, entered the Austrian army (1770), and fought against the Turks, the French republic, and Napoleon I. While serving under the king of Naples he took Rome (1797), but failed to hold it, and at Naples gave himself up to the French. Having escaped from Paris (1800), in 1805 he was sent by the Emporor Francis to defend the Iller. He surrendered to Napoleon at Ulm with his whole army, and was imprisoned, but afterwards pardoned (1819).

Mackay, th. on Pioneer R., Queensland, Australia, 625 m. N.w. of Brisbane; grows sugar. Pop. (1901) 4,091.

Mackay, ALEXANDER MURDOCH (1849 90), Scottish missionary, born at Rhynie, Aberdeenshire; laboured in Uganda (1878-90). See Alexander Mackay (ed. 1899), by his sister.

Mackay, Charles (1814-89), Scottish poet, born at Perth; edited the Glasgow Argus (1844-47) and Illustrated London News (1852), and was war correspondent of the Times during the American civil war (1862 5). But it was as a song writer that Mackay was most widely known: Cheer, Boys, Cheer! The Good Time Coming, Tubal Cain, and England over All were his work. See Mackay's Forty Years' Recollections (1877) and Through the Long Day (1887).

Mackay, HUGH (? 1640-92). British general, born at Scourie in Sutherlandshire. He served Charles II., then fought for France against Holland, and followed William of Orange to England (1689). He was defeated by Claverhouse at Killieerankie, but did good service in Ireland. He was killed in battle at Steinkerk

in Flanders.

Mackay, JOHN WILLIAM (1831-1902), American capitalist, known as the 'Silver King,' born in Dublin: removed to New York (1851), proceeded to Nevada (1852), and by purchasing shares in the Bonanza mine became exceedingly

wealthy. Mackay, ROBERT (1714-78), Gaelic poet, commonly called Rob Donn, born at Allt-na-Caillich in Sutherlandshire. He was without education, being a herd. For some time (1759-67) he was in the Sutherland Highlanders. poems are in the Sutherlandshire dialect, and only a few have been translated-e.g. The Highlander's Return, The Song of Winter, A Poem on Death, and a Satire on Avarice.

Mackaya, a one-species genus of plants belonging to the order Acanthacee. M. bella is a South African plant almost six feet in height, bearing racemes of pale lilac flowers, with very delicate purple markings. It is easy to grow under glass, but by no means easy to flower. During During the summer it should be liberally supplied with water and air. From November to April, however, no water should be given. In spring the flowers should be gradually encouraged to open in a temperature of about 60', lowering the temperature 10° as soon as the flowers open.

M'Keesport, city, Allegheny co., Pennsylvania, U.S.A., on Monongahela R., 12 m. s.e. of Pittsburg. It is in the centre of the bituminous coal region, and has large steel and iron works.

Pop. (1900) 34,227.

M'Kees Rocks, bor., Allegheny co., Pennsylvania, U.S.A., on the Ohio, opposite Allegheny city; has manufactures of glass, iron, and steel. Pop. (1900) 6,352.

M'Kendrick, JOHN GRAY

(1841), Scottish physiologist, born

in Aberdeen. After holding hospital appointments at Chester, London, and Fort-William, he became assistant-lecturer to Professor Hughes Bennett, and then extra-mural lecturer on physi-ology in Edinburgh. From 1876 to 1906 he occupied the chair of physiology at Glasgow Universty. Among his works are Animat Physiology (1875), Lectures on the History of Physiology (1879), Text-book of Physiology (1888), Life in Motion (1892), Life of Helmholtz (1899), and Christianity and the Sick (1901).

Mackenzie. (1.) River, British N. America, rises as the Athabasca, near Mt. Brown in the Rocky Mts., on E. of British Columbia, and flows for 680 m. till it reaches Lake Athabasca, which it leaves as the Great Slave R. It then flows N.W., receiving on l. bk. the rivers Peace and Finlay, and falls into Great Slave Lake. Issuing from this on the w., it is known as Mackenzie R., is about 1,000 m. long, and flows N.W. into Mackenzie Bay. The mouth is closed with ice from October to June. (2.) The mouth is closed with District of N.W. Territories, Canada, created in 1897, and extending from Athabasca and British Columbia on the s. to Arctic Ocean on N., and from Keewatin on E. to Yukon on W. Area, 562,182 sq. m. It is studded with swamps and lakes. The climate is severe in winter; the summers are short and hot. summers are short and There is abundance of timber, and coal, salt, and other minerals exist. Fur-bearing animals abound. Pop. (1901) 5,216.

Mackenzie, ALEXANDER (1822-92), premier of Canada, was born at Logicrait, near Dunkeld, in Perthshire, and emigrated to Canada (1842). He became in 1867 a member of the first House of Commons of the Dominion, and on the defeat of Sir John Macdonald in 1873 he organized a Liberal ministry, which held office till 1878, though Mackenzie headed the Liberal party until 1880. He vigorously supported the union of Canada and England, and opposed the protective tariffs of the Conservative

Mackenzie, SIR ALEXANDER CAMPBELL (1847), Scottish musi-cal composer and violinist, born at Edinburgh. In 1865 he became teacher and organist (St. George's) in his native city. To George's) in his native city. obtain leisure to compose he retired to Florence (1879); but be-Academy of Music (1887), and conductor of the Philharmonic Society (1892) at Crystal Palace (1894). His works commission (1894). His works comprise Jason, a dramatic cantata (1882); Colomba, Mérimée's story as a lyrical drama (1883); The Rose of

Sharon, an oratorio (1884); Veni, Creator (1891); His Majesty, comic opera (1897); The Empire Flag; Scottish Rhapsodies; and incidental music to Ravenswood, Little Minister, and Coriolanus, besides songs, part-songs, and anthems. He belongs to the romantic rather than to the classical school of music.

Mackenzie, Sir George (1636 -91), of Rosehaugh, prosecutor of the Scottish Covenanters, was born in Dundee; and king's advocate from 1677 till 1686, and again from 1688 to 1689. He was a voluminous writer on juris-prudence, constitutional history, and ethical subjects, and was the founder of the Advocates' Library, Edinburgh. See Life, by Ruddiman, prefixed to Collected Works (1716-22); also Memoirs (1722),

by himself.

Mackenzie, HENRY (1745-1831), Scottish man of letters, born at Edinburgh. He was appointed attorney for the crown to the Exchequer Court in Scotland, and later comptroller of taxes (1804). He is, however, best known as a man of letters. Man of Feeling appeared in 1771. being a delineation of the character of one who is afflicted with excessive sensibility. This was followed by The Man of the World (1773) and Julia de Roubigné (1777). He was also the author of the lives of Dr. Blacklock, the blind poet, and John Home, author of Douglas, and was a leading contributor to the Mirror and Lounger, of which he was editor. He was the first to call attention, by his essay in the Mirror, to the genius of Burns. His influence led Walter Scott and others to begin the study of German.

Mackenzie, SIR MORELL (1837-92), English physician, was born at Leytonstone, Essex. In 1863 he won the Jacksonian prize (Royal College of Surgeons) for an essay On the Pathology and Treatment of Diseases of the Larynx. He published a Manual of Discases of the Throat and Nose (2 vols. 1880 4), which is a leading text-book. Mackenzie attended Frederick, Emperor of Germany, in his fatal illness (1887-8). A mistaken diagnosis of the disease in its early stage (afterwards found to be cancer in the throat), and a somewhat polemic attitude on Mackenzie's part, led to strained relations with the German doctors in attendance. Ill-feeling was increased by the publication by Mackenzie of The Fatal Illness of Frederick the Noble (1888). See

Life by Haweis (1893).

Mackenzie, WILLIAM LYON (1795-1861), leader of Canadian rebels, was born at Dundee, and emigrated to Canada in 1820. As a journalist, he took an extreme stand on the popular side in the struggle for retorm. In 1828 he was elected to the legislature, but was expelled for libelling that body; his constituents, however, re-elected him each time he was expelled. The reformers sent him to appeal directly to the Imperial Parlament. After his return from London he became nore violent, and in 1837 became leader of the rebels in the insurrection in Upper Canada. He established a provisional government, but eventually retired to the United States until 1849.

Mackerel (Scomber scombrus) belong to a family of bony fishes, the Scombridæ. The other important species are the tunny and the bonito. The common mackerel ranges from the south of Norway to the Canary Is., and throughout the Mediterranean. In the British Isles it is abundant on the south and southwest coasts of Ireland, and in the English Channel; but it may be found along the whole of the east and west coasts. On the American side its range is from Cape Hatteras to the Strait of Belle Isle. It lives largely upon other fish, as young herrings, sprats, sand-eels, pilchards, and anchovies, but also on small crustaceans. It spawns in May, June, and July, approaching to-wards the coast from the open sea; the female sheds from about 300,000 to more than double that number of eggs, which are pela-gic or buoyant. Hatching takes place about the sixth or seventh day. It is believed that mackerel attain sexual maturity at three years of age, when they measure twelve or thirteen inches; occasional specimens measuring eighteen or twenty inches are secured. The migrations of the mackerel are not well understood, and the movements of the shoals may be erratic, so that the fishery is liable to great fluctuations.

In Norway there are two fisheries, one from May to July, along the south and south-west coasts, chiefly by drift-nets and seines; the other in the North Sea, from July to October, by lines with hooks towed astern by the vessel under sail. Those caught by the last method are mostly cured for the American market. In Ireland the mackerel fisheries are the most valuable of all—viz.: (1) the spring fishing from March till June, drift-nets being used, and English, Scotch, Manx, and French boats taking part in it; (2) the autumn fishing from July to November, with drift-nets, seines, and seines, and whiffs, the mackerel being mostly cured and exported to America. The annual value rangos between £100,000 and £200,000. The English fishery is carried on chiefly on the south coast; the value in 1904 was £270,940. In America the mackerel fishery is much less productive than formerly. The annual value of the European mackerel fisheries may be placed at about £700,000; those of the world at over £1,500,000. See Affalo's Sea-Fishing Industry of England and Wates (1904), and Johnstone's British Fisheries (1905).

Mackinlay, Mrs. John. See Sterling, Antoinette.

M'Kinley, Mount, the highest peak in the N. American continent, in Alaska, 63° 5′ N., 151° 45′ w.; height, 20,464 ft. The peak is surrounded by glaciers.

M'Kinley, WILLIAM (1843-1901). twice president of the United States, was of Scoto-Irish descent. and was born at Niles, Ohio. He served as a volunteer during the civil war, and after the close of the war adopted law as his profession (1867). He was first elected to Congress in 1876, and served till 1891, when he was elected governor of Ohio. was an enthusiastic protectionist, and as chairman of the Committee of Ways and Means gave his name to the tariff of 1890, the high-water mark of protectionism in the United States. In 1896 he was elected republican president. He was re-elected in 1900, but was shot at Buffalo by an anarchist named Czolgosz. See Life by Halstead and Manson (1902), and Fallows (1902).

Mackintosh, Sir James (1765-1832), Scottish philosopher, was born at Aldourie, near Inverness. A prominent figure in London literary and political society, his strong sympathy with the principles of the French revolution prompted him to reply to Burke in Vindiciae (tallica (1791), though he afterwards repudiated the views therein set forth. In 1803 Mackintosh was appointed to the recordership of Bombay. From 1806 to 1811 he was judge in the Court of Admiralty. He wrote a Dissertation on the Progress of Ethical Philosophy (1830), and a Life of Sir Thomas More (1830). See Life by R. J. Mackintosh (2 vols. 1836).

Macklin, CHARLES (?1699-1797), British actor, was born in Ireland; first appeared in London in 1734, and continued to play there, for the most part at Drury Lane, until his retirement in 1753. Six years later he reappeared, and continued to act until 1789. He won high praise for his portrayal of Shakespearcan characters, particularly that of Shylock. His life was a succession of quarrels and disputes, in great part arising from his ungovernable temper. He was the author of several plays, the best

known being Love à la Mode (1759) and The Man of the World (1781).

Macknight, James (1721-1800), Scottish Scriptural critic and translator, was born at Irvine, Ayrshire; he entered the Church of Scotland, holding pastorates at Maybole, Jedburgh, and Edinburgh. He published a Harmony of the Gospels (1756), and a Literal Translation of all the Apostolic Epistles, with a Commentary and Notes (1795), the work of thirty years. See Account by Thomas Macknight (1806).

Mackenochie, Alexander Heriot (1825-87), English divine, was born at Fareham, Hampshire. While curate-in-charge of St. Alban's, Holborn, London, he underwont (1867-82) numerous prosecutions for ritualistic ceremonies and accessories. For a short time in 1883 he was vicar of St. Peter's, London Docks, but resigned owing to fresh difficulties. See Memoir by Mrs. Towle (1890).

Maclagan, William Dalaximple (1826), archbishop of York, was born in Edinburgh. He was rector of St. Mary's, Newington, London; then vicar of St. Mary Abbott, Kensington, till 1878, when he was appointed bishop of Lichfield. In 1891 he was made archbishop of York. He has published Pastoral Latters and Symodal Charges (1892), and was jointeditor of The Church and the Age (1870).

Maclaren, IAN. See WATSON,

Maclaurin, Colin (1698-1746), Scottish mathematician and natural philosopher, was born at Kilmodan, Argyllshire. He was appointed (1717) to the mathematical chair at Marischal Collere, Aberdeen, from which, in 1725, he passed to Edinburgh University. For the insurance fund for widows of Scottish ministers and professors he voluntarily worked out the calculations. In his numerous mathematical essays and works he followed Sir Isaac Newton's methods. He also designed and superintended the building of the fortifications of Edinburgh in 1745. See Life prefixed to the Account of New-

by Maclaurin (1748).

M'Lean, ALLAN (1840), Australian statesman. He became premier of Victoria (1899-1900), commissioner of crown lands and survey (1890-1), president of Board of Land and Works (1890-1), minister of agriculture (1890), chief secretary (1891-3), and sat in the Turner administration (1894-8). In 1904 he became commonwealth minister of

ton's Philosophical Discoveries.

trade and customs.

Macleania, a genus of shrubs, natives of Mexico and S. America, belonging to the order Vaccini-

aceæ. They bear showy cylindrical flowers, either solitary or in fascicles or corymbs.

Maclehose, AGNES (1759-1841). the 'Clarinda' of Burns's poems, was born in Glasgow. After her separation from her husband a mutual attachment sprang up between her and Robert Burns.

between her and Robert Burns. Their correspondence was published in 1843. See Life by W. C. Maclehose, prefixed to Correspondence (1843).

M'Lennan, JOHN FERGUSON (1827-81), Scottish sociologist, was born at Inverness. In 1857 he became a member of the Scottish ter card callinged considerable bar, and achieved considerable success, latterly, as draftsman of parliamentary bills (Scotland). He is more widely known as the propounder of the matriarchal theory of primitive society, in An Enquiry into the Origin of the Form of Capture in Marriage Ceremonies (1865), reissued and enlarged (1876 and 1886) as Studies in Ancient History. He was also author of an attack on The Patriarchal Theory (1885), and Memoir of Thomas Drummond (1867).

Macleod, FIONA. See SHARP,

WILLIAM.

Macleod, HENRY DUNNING (1821-1902), Scottish political economist, born at Edinburgh; devoted himself to economical questions, and became an authority on banking principles, bills of exchange procedure, and general commercial law. Author of Theory and Practice of Banking (1856), a standard work; Prin-ciples of Economical Philosophy (1873); Elements of Economics (1881-6); and Rimetallism (2nd ed. 1894)). See Quarterly Review (October 1901).

Macleod, NORMAN (1812-72), Scottish preacher and author, was born at Campbeltown, Argyllshire. He became in 1838 minister of the Church of Scotland at Loudon (Ayrshire), Dal-keith (1843), and the Barony Church, Glasgow (1851-72). In 1857 he was appointed chaplain to Queen Victoria. He edited Good Words from 1860, and devoted much effort to the furtherance of foreign missions. Besides sermons, he published sketches and stories of considerable merit. See Memoir by Donald Macleod

(2 vols. 1876). Macles, or TWIN CRYSTALS. Crystals tend to occur in groups of two or more, associated to-gether according to definite laws. Those which have certain faces parallel in the different crystals, but others not, are known as macles, or twins. This is true macles, or twins. This is true especially of the zeolites; and in plagioclase felspar, the crystals, though apparently simple, are built up of very many thin lamellæ, each of which is a twin

crystal. The physical explanation of the relationship is the existence of two positions of molecular stability. Sometimes the twin halves do not meet in a definite plane, but interpenetrate one another irregularly, as is frequent in quartz. When twinning is repeated twice a 'trin' is produced, consisting of three twin parts; other crystals consist of an indefinite number of twinned individuals, and are said to be polysynthetic.

Maclise, DANIEL (1806-70), Irish historical and genre painter, born at Cork. His first notable picture was a water-colour drawing, Malvolio Affecting the Count (1829); his All - Hallow Ere (1833), an Irish interior containing portraits of Sir Walter Scott and Crofton Croker, made a further impression; and in 1835 he was elected A.R.A. Full hon-ours followed in 1840. During the years 1830-6 he executed, under the name of Alfred Croquis, his remarkable character portraits' for Fraser's Magazine; and his later work includes historical compositions, cartoons, easel pictures, water-colour drawings, and portraits. From 1851 to 1864 he was engaged on The Interview between Wellington and Blücher, The Death of Nelson, and other frescoes for the Houses of Parliament. His Hamlet and a second Malvolio are in the Tate Gallery, London, and his Charles Dickens in the National Portrait Gallery, London. See Life by O'Driscoll (1871).

Maclura, a genus of hardy deciduous trees belonging to the order Urticacow. The only species is M. aurantiaca, the bow-wood or Osage orange, bearing yellowish-green flowers, followed by light yellow fruits about the size of oranges. It is a spiny plant, native to N. America, where it is often used as a

hedging plant.

MacMahon, MARIE EDMÉ PATRICE MAURICE DE (1808-93), Duke of Magenta and marshal of France, was born at Sullysur-Loire, near Autun, of Irish descent. After serving with dis-tinction in Algeria, he was appointed governor-general (1864-0) of the province. Arriving in the Crimea (1855), he assaulted the Malakoff successfully (September 8). At Magenta he saved the day (1859), and was made duke and marshal on the field. In 1870 he failed to defend Alsace (beaten at Wörth), but, conducting a brilliant retreat, was placed in command of 120,000 men, with orders to join Bazaine. In doing so he was surrounded, and capitulated at Sedan. On his return from Wiesbaden (1871) he took Paris from the commune after desperate fighting, and

succeeded Thiers (1873) as president of the French republic, resigning in 1879. See Lires, in French, by E. Daudet (1882) and Laforge (1898).

MacMaster, JOHN BACH (1852), American historian, biographer, and engineer, born in Brooklyn, New York; was ap-pointed instructor in civil engineering at Princeton (1877-83), and in 1883 professor of American history at the University of Pennsylvania, a chair he still holds. He has written Bridge and Tunnet Centres and High Masonry Dams; A History of the People of the United States (1883-1900); Benjamin Franklin as a Man of Letters (1887); With the Fathers (1896); Origin, Meaning, and Application of the Mourse Doc-trine (1897); and Daniel Webster (1902).

Macmillan, English publishing house, was founded by Daniel (1813-57) and Alexander Macmillan (b. 1818); settled in London in 1839; established a business at Cambridge. The years 1858-72 mark the establishment of a London house; 1869 the opening of a branch in New York (now an important publishing centre); 1893 the conversion of the business into a limited liability compuny. In 1891 they printed a bibliographical catalogue of publications from 1843 to 1889 in-clusive. In 1901 they started in Bombay a publishing centre for India, Burma, and Ceylon. Macmillan's Magazine was started in 1860 as a shilling monthly, but was reduced to sixpence in 1905. See Hughes's Memoir of Daniel Macmillan (1882).

Macmillan, Hugh (1833-1903), Scottish minister and author, was born at Aberfeldy, Perthshire. He was the author of First Forms of Vegetation (1861), Bible Teachings in Nature (1867), The Garden and the City (1872), Roman Mosaics (1888), My Com-fort in Sorrow (1890), The Daisies of Nazareth (1894), Gleanings in Holy Fields (1899), The Highland Tan (1901) and a mosaical Tay (1901), and a monograph on G. F. Watts, R.A. (1904). He was minister of the Free West Church,

Greenock, until 1901.

Macmonnies, FREDERICK (1863), American sculptor, born in Brooklyn; was apprenticed when seventeen to the sculptor St. Gaudens, and also studied under Falguière in Paris. In 1889 he exhibited his Diana at the Salon. Among his statues, characterized by effective composition, refinement of modelling, and admirable equilibrium, are Nathan Hale, in City Hall Park, New York; Sir Harry Vanc, in the new Boston Public Library: and the colossal figure of Victory on the battle column at West Point.

Macnaghten, SIR WILLIAM HAY (1793-1841), British diplomatist and Orientalist, born probably at Bushmills, Co. Antrim. His name is associated with the British intervention in the affairs of Afghanistan (1838), and the dispatch of an expeditionary force, which culminated in the occupation of Kabul. He was assassinated by the chief, Akbar Khan, whilst attending a conference at Kabul.

Macnamara, THOMAS JAMES (1861), educationist, was born at Montreal. From 1876 to 1890 he was a school board teacher at Exeter, Huddersfield, and Bristol, and became president of the National Union of Teachers (1896). Since 1892 he has edited the Schoolmaster, an authoritative organ on elementary education. He became associated with the London School Board as progressive member for West Lambeth in 1894, and remained connected with it until its dissolution by the Education Act of 1903. He has represented North Camberwell since 1900. He is a strenuous advocate of a sound and efficient system of national education. He is also keenly interested in all social and labour questions. He is, further, the author of the 'Cockerton' Act of 1902, and has published School-room Humour (1905).

Macneill, HECTOR (1746-1818), Scottish poet, born at Roslin, Midlothian. He worked in a mercantile warehouse in Guadeloupe, and in 1780 was appointed assistant secretary to two flagships. His first poem, The Harp, appeared in 1789, and Scotland's Scatth, or the History of Will and Jean, in 1795, and The Waes o' War in the following year. His Poetical Works were issued in 1801 (reprinted 1856). He is best known as the author of the songs Will and Jean, My Boy Tammy, and Come under my Plaidie.

MacNeill, JOHN GORDON SWIFT (1849), Irish politician, was born at Dublin, and was professor of constitutional and criminal law at King's Inn, Dublin (1882-88). He has represented South Donegal since 1887 as a member of the Nationalist party. He is the author of The Irish Parlia-ment (1885), How the Union was carried (1887), and Titled Cor-

ruption (1894).

Macon. (1.) Anc. Matisco, cap., dep. Saône-et-Loire, France, on Saône R., 40 m. N. of Lyons. Its old cathedral is now in ruins. Watches and agricultural implements are made. The town is celebrated for its wines, and was the birthplace of Lamartine. Pop. (1901) 18,928. (2.) City, Georgia, U.S.A., co. seat of Bibb co., 80 m. s.E. of Atlanta. It has

iron foundries, and manufactures cottons and machinery, and is the seat of Mercer University. Pop. (1900) 23,272,

Macpherson, James (1736-96), 'translator' of Ossian, was born at Ruthven, Inverness-shire. In 1760 he published, with translations, a collection of old Gaelic poems, as Fragments of Ancient Poetry. This was followed, in 1762 and 1763 respectively, by his 'translations' of Ossian's Fingal and Temora. There can be little doubt that these 'Ossianic' poems were to a great extent Macpherson's own, but that he used in their composi-tion a number of fragments of Gaelic legends. He was agent to the nabob of Arcot from 1780 until his death. He was buried in Westminster Abbey. See Life by Saunders (1895), and Smart's James Macpherson, an Episode in Literature (1905).

Macquarie. (1.) Group of uninhabited isls., S. Pacific, 500 m. s.w. of New Zealand, to which it has been annexed. Area, 170 sq. m. (2.) River, N.S.W., Australia, formed by the junction of the Fish and Campbell Rivers; tributary of the Darling. Total

course, about 350 m.

Macqueen, Robert, Lord BRAXFIELD. See BRAXFIELD.

Macready, WILLIAM CHARLES (1793-1873), English actor and manager, born in London; appeared (1810) at Birmingham as Romeo, and in 1811, at New-castle, played Hamlet with Mrs. Siddons. Subsequently he acted at Covent Garden, Drury Lane, Dublin, Edinburgh, and Paris, dominating the stage (1819) as Richard III. His favourite parts were Macbeth and Werner; but he created, amongst others, Vir-ginius, Strafford, Claude Mel-notte, Richelieu, and Alfred Evelyn in Money. In the United States (1849), owing to Edwin Forrest's enmity, his theatre was mobbed. See his Diary and Reminiscences (1875), and Life by W. Archer (1890).

Macrinus (164-218 A.D.), emperor of Rome from 217 to 218 A.D., was born at Casarea, in Mauritania, and was prefect of the prætorian guards under Caracalla. He was severely defeated near Nisibis by the Parthians. His troops mutinied and defeated him near Antioch. He fled to Chalcedon, but was betrayed

and executed.

Macrozamia, a genus of evergreen Australian plants of the order Cycadacea. They bear mostly ovoid cones, with hard scales thickened at their apices. They are easily grown under glass, in well-drained peaty loam.

MacTaggart, WILLIAM (1835), Scottish painter, a native of Campbeltown, one of the leaders of the Scottish impressionist school. He holds place in Scotland much in the same way as does Watts in England. Orchardson, James Pettie, and MacTaggart were fellow-students. His work has run principally in the interpretation of nature, more particularly when allied with the dominating actions of man. A brilliant colourist, he has a mode and style of his own. As a painter of fisher-folk he is pre-eminent—c.g. his Harbour Bar and Through Wind and Rain. In portrait-studies of children he has also excelled—e.g. The Belle. Painter of Summer Breezes and Dora (National Gallery, Edinburgh).



M. stultorum; 2, M. subtruncata;
 M. solida (chewing animal).

Mactra, a genus of bivalve molluses, including a number of common British species. Fool's maetra (M. stultorum), in which the shell is prettily marked with radiating lines, is very common on sandy shores, and has a deli-cate and brittle shell. All the species live in sand, and are capable of using the foot in leaping. The shell is triangular, the two valves being equal.

MacWhirter, JOHN (1839), Scottish painter, born at Slateford, near Edinburgh. He was elected A.R.A. (1879) and R.A. (1894). A brilliant member of the Scottish school of painting, he excels in depicting the rugged beauty and lonely grandeur of the Highlands and moors of Scotland, and notably mountain birches. His diploma work was Nature's Archway. His June in the Austrian Tyrol was purchased out of the funds of the Chantrey Bequest, and is in the Tate Gallery, London. Among other examples of his brush are The Lord of the (Hen, The Track of the Hurricane, The Silver Strand, Loch Katrine. He is the author of Landscape Painting in Water Colour (1900).

Madagascar, isl. in the Indian Ocean, separated from E. coast of Africa by Mozambique Chan-nel, 250 m. wide. Its extreme length, from Cape Amber in the N. to Cape Sainte Marie in the s., is 980 m. and its average breadth 270 m. The main orographical

features are two plateaus, one occupying the northern extremity as far s. as Mandritsara in 16½° s. lat.; the other, of far greater area, extending over Imerina, Betsileo, and Bara, nearly to 24° s. lat. These plateaus are separated by a saddle less than 2,000 ft. high, which has played an important part in the history of the island. The greater plateau

gascar (8,790 ft.). Diégo Suarez, formed by the peninsula of Cap d'Ambre, is one of the best harbours in the world. Tamatave also is a good harbour, and Antongil Bay affords safe anchorage. The N.W. coast is much indented, and has harbours at Nossi-Bé, Port Radama, and the bays of Bombétoke (Majunga) and Betsiboka. The climate is trop-

Gloridao P. (br.) Mahambo H Q Ú 0 ٧ \$0 0 × থ \geq MADAGASCAR English Miles

Bartholomew Edger

slopes from E. to W., frequently rising to 5,200 ft. on the E., but seldom exceeding 3,900 ft. on the W. Towards the E. coast the descent is very rapid, while on the W. lies a country of plains and flat-topped hills 1,300 to 1,600 ft. above sea-level. Extinct volcances are scattered over the island, the chief being Ankaratra, the culminating point of Mada-

ical, and there is a dry season from May or June to December, and a wet season. At Diégo Suarcz the annual mean temperature is about 80°, the highest in the island, and the range is from 73° to 88°. The rainfall is about 28 in. Towards the s. the temperature is lower, while the rainfall is from 40 to 60 in. The high plateaus enjoy a more temperate

climate. At Tananarivo the mean is 55°, and the average rainfall 54 in. Thunderstorms and hurricanes occur frequently. The forests yield valuable timber rosewood, mahogany, palisander (jacaranda), and obony—fibres (as raffia and Musa textilis), copal and other gums, and india-rubber. Edible fruits, as ground-nut, coco, bread-fruit, banana, mango, tamarind, and lemon, are common; and cotton, hemp, vanilla, sugar-cane, coffee, and cocoa are grown. The traveller's tree is a striking form; ferns are par-ticularly abundant. The fauna is marked by the presence of lemurs and the curious aye-aye. The most widely distributed minerals are iron and gold, the export of the latter in 1905 being valued at £275,000. The most prominent people are the Antaimerina or Merina, known to Europeans as Hovas. They live on the plateau of Imerina, and their dominion before the French occupation extended over two-thirds of the island. Textiles are woven from the fibre of the Raphia palm, and silk is produced. Rum is manufactured, and oil from several fruits. Hand-carts are used for transport, and within the last few years the roads have been properly made; formerly they were mere footpaths. Automobiles are coming largely into use for passenger conveyance. The French have opened a railway (92 m.) from Brickaville on the E. coast to Moramanga, which will be continued to Tananarivo. The exports, consisting chiefly of live animals, animal products, oils, fibres, grains, and textiles, amounted in 1905 to the value of £902,160, and the imports to £1,24,936.

Madagascar was annoxed by the French in 1895. In 1868 Protestant Christianity was proclaimed the state religion of the Hovas, but the people still retain many superstitious observances. 1902 there were 450,000 Protestants and 50,000 Catholics in a population in 1901 of 2,505,237. Of these the Hovas and Sakalavas numbered 850,000; the Betsileos, 600,000; the Ibaras and other southern tribes, 400,000; the Betsimisarakas and other east coast tribes, 400,000; the Sihanakas and other northern tribes, 300,000. The capital is Tananarivo. Area, 227,750 sq. m. See Sibree's Madagascar and its People (1870), The Great Africal Control of the Con

See Sibree's Madagascar and its People (1870), The Great African Island (1880), and Madagascar before the Conquest (1896); Cousins's Madagascar of To-day (1895); Catat's Voyage à Madagascar (1896); Grandidier's Histoire physique, naturelle et politique de Madagascar (1876, etc.); T. T. Matthews's Thirty Years in Madagascar (1904).

Madaya Rao, Sir Raja T. (1828-91), Indian administrator, born at Combaconum, Madras. Although a faithful Brahman, he displayed outside his caste the most liberal views, and encouraged and promoted social and political reforms. He was prime minister of Travancore in 1857. During the minority of the Gaekwar of Baroda he acted for ten years as administrator of the state.

Maddaloni (anc. Sessuela), city, Caserta, Italy, 14 m. N.E. of Naples. It possesses a royal college and a military school. Weaving and quarrying are the chief industries. Pop. (1901) 21,270.

Madden, SIR FREDERIC (1801 73), English palaeographer and antiquary, was born at Portsmouth. He has edited an edition of Havelok the Dane (1828), Layamon's Brut (1847), and Wycliffe's Bible (1850), the last named with Rev. Josiah Forshall. In 1837 Madden became head of the manuscript department of the British Museum. His journals, etc., in the Bodleian Library are to remain unopened till 1920. See Memoir by Connop Thirlwall (1873).

Madder, the root of Rubia tinctoria and other plants of the same family, was formerly largely grown in W. Europe, Turkey, and Japan. There are several varieties, which are prepared for the market by keeping and grinding. Madder was at one time very valuable on account of the colouring matters, alizarin and purpurin, that are present in the root as glucosides, but it is now very largely superseded by synthetically prepared alizarin.

Madeira, a wine which closely resembles sherry, having a fine. soft, mellow flavour, combined with elegance and an exceptionally beautiful bouquet. It is a fortified wine, containing from 16 to 21 per cent. of alcohol. Many of the best brands are sent on long sea-voyages to modify and improve them. Among the important brands are Boal or Bual and Verdelho, rich, mellow, and choice; and San Antonio and Sercial, fine, dry, and pale.

(1.) Group of Portu-Madeira. guese islands in the Atlantic, 390 m. w. of Morocco, comprising Madeira, Porto Santo, Desertas, Bujio, and Selvagens, the three first only being inhabited. Area, 315 sq. m.; pop. (1900) 150,528, mostly on Madeira. Madeira itself is an oval island, measuring 35 m. by 15 m. The coasts are steep and rocky; the highest point, Pico Ruivo, reaches 6,060 ft. The mountain slopes are terraced for cultivation, and fruits of all kinds are grown with the help of irrigation. Its equable and salubrious climate has

made Madeira a favourite health resort for Europeans. Wines. fruits, vegetables, honey, sugar, wax, cane and wicker goods, lace, and straw hats are exported. The imports in 1905 amounted to £438,231, and the exports to £211,896. Funchal, on the s. coast, is the capital. Colonized by the Portuguese in the 15th century, Madeira was occupied by the British in 1801 and 1807-14. German activity in trade and also in the building of sanatoria, hotels, and other enterprises during recent years has been excessive. The granting of concessions to German companies by the Portuguese government in 1905 6 was the cause of much comment, and gave rise to some ill-feeling. (2.) See Amazons, Peru.

Madhava Achárya, Hindu Sanskrit scholar and writer of the 14th century. To him is attributed the Pardsara-Madhariyam, a classification of Hindu religious law, subsequently supplemented by his Vyarahāra, which dealt with systems of law as generally understood. He is also responsible for important digests relative to ancient Indian philosophy, especially an intro-duction to the Mimansa system, and a commentary on the same.

Madhu Sudan Datta (1821-73), Indian poet and man of letters, was born at Sagandari, Bengal; early embraced Christianity. He issued in Bengali the classical dramas, Padmarati, Sarmishtha, and Kumari (1858 61), followed by the epic Meghanad-

Badha, instinct with lofty ideas.

Madison. (1.) City, Wisconsin, U.S.A., cap. of the state, and co. seat of Dane co., 75 m. w. of Milwaukee. It manufactures agricultural implements, machinery, tools, flour, boots and shoes, carriages, and electric appliances. Madison is the seat of the university of Wisconsin. Pop. (1900) 19,164. (2.) River, Montana, 19,164. (2.) River, Montana, U.S.A., has its source in the S.W. of the state, and flows nearly N. to its junction with the Gallatin and Jefferson to form the Missouri.

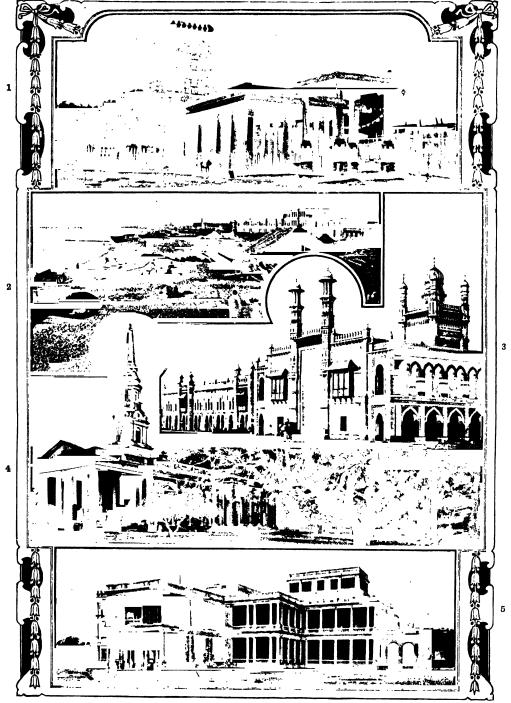
Its drainage area is 2,285 sq. m. Madison, James (1751-1836), president (fourth) of the United States, was born at Port Conway, Virginia. His great work was done during and after the war of independence in working out the union of state and federal law. He also advocated religious freedom and the acceptance of the impost law by the states, suggesting the famous compromise known as 'the three-fifths rule,' by which (in taxation) five slaves were rated as three freemen. His was the 'Virginia Plan' of federation (1787), and he was joint-author of The Federalist, a political science treatise (republished 1888). In 1801 he was

secretary of state under Jefferson, and was president for a double term (1809-17). See Madison Papers (1841) and Letters (1865); also Life by Gay (1884) and by Hunt (1902).

Madness. See Insanity and LUNACY.

Madonna, the term usually applied to representations of the Virgin Mary in art. The carliest existing picture of her is said to be one in the Capella Greca in the catacombs of Priscilla, Rome, assigned to the first half of the 2nd century. Other early examples show traces of classic form, and in Rome that tendency persisted even after Byzantine influence asserted itself throughout Italy. The famous Rucellai Madonna in Santa Maria Novella, Florence, which is attributed to Cimabue by tradition, but is now assigned by some critics to Duccio, the great statue of the Virgin and Child, and the exquisite ivory statuette by Giovanni Pisani, still in Pisa, and the Majestas by Duccio, which was carried in triumphal procession through the streets of Siena in 1311, show a freer and more natural manner. With the great artists of the 14th, 15th, and 16th centuries the Madonna was a favourite subject. Favourite incidents are the Annunciation, the Holy Family, the Adoration, the Assumption, and the Coronation. Other celebrated Madonnas are by Man-tegna, Botticelli, and Bellini, two or three reliefs by Donatello, and Michael Angelo's statue in the Medici chapel, Florence; the Medici chapel, Florence; Leonardo's Virgin of the Rocks; and three famous Raphaels-the Madonna degli Ansidei, the Madonna della Sedia, and the Madonna di San Sisto. See Jameson's Legends of the Madonna (2nd ed. 1857), Venturi's La Madonna (1900), and Baumbach's Die Madonnendarstellung in der Malerci (2nd ed. 1896).

Madras. (1.) Presidency of India, at the s. extremity of the peninsula. Its N. limits reach the Bombay Presidency on the one side, and the Bengal Presidency on the other, with the dominions of the Nizam and the Central Provinces between. area is 141,190 sq. m. British territory, besides 9,610 sq. m. under native rule. The E. and W. Ghats run parallel with the respective coasts, and are linked at the s. by the Nilgiri Hills. The rivers (Jodavari, Kistna (Krishna), and Cauvery rise in the W. Ghats, and discharge into the Bay of Bengal. The only important lake, Pulicat, 33 m. long, lies N. of the capital. Gold is mined in Mysore and in the Nilgiris; copper and lead in the E. Ghats; garnets and diamonds are also found; iron, coal, and silver exist,

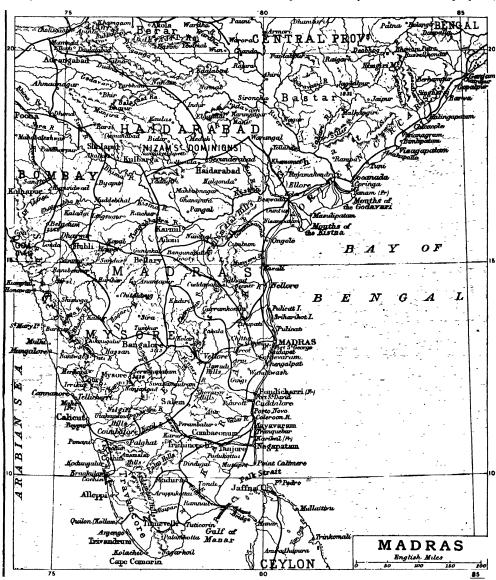


Views in Madras.

but are not exploited. Forests cover 15,862 sq. m. Famines have been rather frequent, the worst being those of 1833, 1865-6, 1876-78, and 1892. Although the presidency has no natural harbours,

were valued at £5,183,200 and the exports at £10,437,100. The chief articles of export are hides, coffee, raw cotton, rice, oils, spices, indigo, coir, sugar, tobacco, and tea. The native state of Mysore is

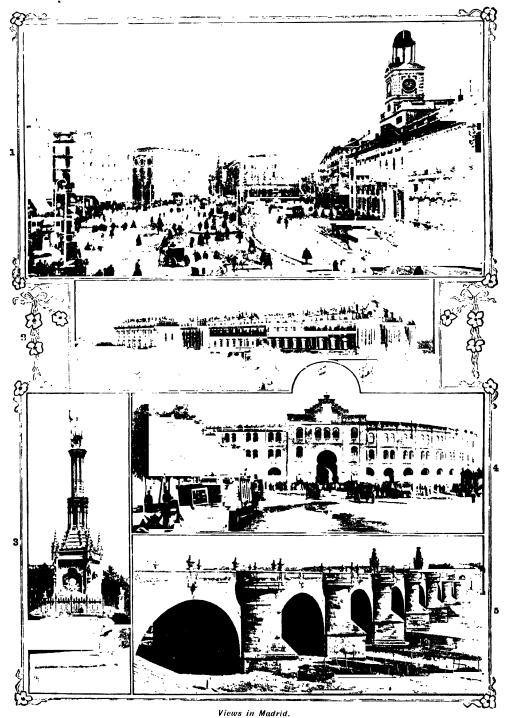
proportion of Christians (mostly Roman Catholics) is larger than in any other part of India. The Laccadive and Maldive Islands, off the Malabar coast, are, for administrative purposes,



Madras on the E. coast is one of the most important in the Indian empire, and Kanara, Malabar, and Travancore on the w. are centres of considerable export and import. In 1905-6 the imports of sea-borne merchandise

directly administered by the imperial government of Calcutta. Travancore is ruled by a maharajah on European lines. The bulk of the population are Hindus, and a considerable percentage Mohammedans, but the

included in the Madras Presidency. Pop. (1901) 38,623,066. (2.) Capital of above presidency, on the Coromandel coast, in lat. 13° 4′ N., and long. 80° 15′ E. Notwithstanding that it has no natural harbour, it ranks among



1. Puerta del Sol. 2. Royal Palace. 3. Monument to Columbus. 4. The Bull Ring. 5. The Toledo Bridge.

the foremost seaports of British India. On the foreshore is 'Black Town,' the commercial quarter; to the s. is the citadel, Fort St. George, Government House, and the public offices; the densely-populated native quarters straggle to the w. and s.; then come the houses of the Eurasian population; and beyond, the residences of Europeans. The total trade in 1904-5 was valued at £8,055,600.

In 1504 the Portuguese founded here the town of St. Thomé. In 1639 the rajah of Chandragiri granted to the East India Company a site close to St. Thomé. at the Bedside of Ferdinand II.. (1843), The Three Holy Women at the Sepulchre (1845), and the portrait King Don Francisco.

Madrepore. See CORAL,
Madrid. (1.) Province, Spain,
occupying the southern and eastern slopes of the Guadarrama
Mts., and reaching down to the
Tagus near Toledo. The climate
is arid and parched in summer
and bleak in winter. The productions, apart from the capital, are
mainly agricultural and horticultural. Much granite and freestone are quarried. Area, 3,084
sq. m. Pop. (1900) 775,034, including the capital. (2.) Capi-

Red Hill Tangal Madras Railway Harbour () LACKTOWN *Attvput Kilmank Ft St George Ağgragu MADRAS B Naboba Choultry 0 ST THOMÉ Moodly · da , D S. Thomas Monat A Vellicher Tirevam B English Miles Sta-

Madras City.

Attacked in 1702 by Aurungzebe's army, in 1741 by the Marathas, Madras fell to the French in 1746. In 1748 it was restored to the British by the treaty of Aixla-Chapelle. Pop. (1901) 509,346: 256,730 males, 252,616 females. Madrazo y Kuntz, Federico DE (1815-94), Spanish painter of

Madrazo y Kuntz, Federico DE (1815-94), Spanish painter of historical and portrait subjects, was born at Rome; succeeded his father as director of the Prado Callery in Madrid, and was professor at the Madrid Academy. Among his works are Godefroy de Bouillon proclaimed King of Jerusalem (1839), Maria Christina

tal of above prov. and of Spain; stands on a bloak, treeless tableland between the Guadarrama Mts. and the Tagus, at an elevation of 2,140 ft. The history of the city begins with the Moors, by whom it was called Magerit. It was captured by Ramiro 11. of Leon in 933, but was again lost. Ferdinand I., it is asserted, again took it temporarily in 1047. It became permanently a Christian city under Alfonso VI. of Castile (1083). When Philip II. made it the capital of the realm (1560), the city contained a population of 25,000, and then increased

rapidly. Its streets are wide and handsome, especially that of Alcala, one of the finest streets in Europe. The central square is the renowned Puerta del Sol, into which ten streets debouch. In addition to the university there are a normal school, veterinary school, schools of commerce, engineering, architecture, music, and the fine arts. National Library contains 600,000 volumes and 30,000 manuscripts; while the National Museum of Painting and Sculpture has a fine collection of the works of Raphael, Titian, and Rubens, in addition to the most famous productions of Volasquez. The city experiences scorching southerly winds and fierce heat in summer, and icy blasts from the snowclad Sierra Guadarrama in winter. Industrially it is not very active. tobacco being the chief manufacture. Pop. (1900) 539,835.

Madrigal, a term often used in a loose sense for any light song, but properly denoting a type of song of Italian origin which normally consists of two or three tercets, followed by one or more couplets. It is also used for the music written for such songs. Madrigals were either sung by three or more unaccompanied voices, or played upon viols. They were written by most of the 16th and 17th century composers. Ultimately the form was merged in the glee. See Oliphant's Short Account of Madrigals (1836), Musa Madrigalesca (1837), and F. E. Schelling's A Book of Elizabethan Lyrics (1895).

Madura. (1.) Capital of dist., Madras Presidency, India, 270 m. s.w. by rail of Madras. For centuries it was the religious and political capital of S. India, and it contains some of the finest extant examples of Hindu architecture, including the granite temple of Minarchi, or the Fish Mother. Rebuilt in the 2nd or 3rd century, it was nearly destroyed during the Mohammedan conquest of the 14th century. Its present splendour is due to Tirumulla Nayak (1623-59). The town has coffee and cotton mills and cigar factories. Brass-ware and dyed cotton-cloth are also made. Madura is the centre of American mission effort in South India. Pop. (1901) 105,984. (2.)
Mountainous isl., Dutch East
Indies, separated from Java on the w. by the Surabaya Strait, and on the s. by the Madura Strait. Fishing and cattle-rearing employ most of the inhabitants. Area, 1,770 sq. m. (1897) 1,652,580.

Madvig, JOHAN NICOLAI (1804-86), Danish scholar and statesman, born at Svaneke in Bornholm; became (1829) professor

of Latin language and literature at Copenhagen University, resigning in 1880. He compiled a Latin Grammar (1841) and Greek Syntax (1846), long famous, and issued noteworthy editions of of Moskenäs and Mosken, in the Lofoden group. It is only when the north-westerly gales blow against the tide that this current is dangerous. See E. A. Poe's imaginative description.



Cicero's works, and Emendationes Liviance (1860). About 1848 he entered parliament, and became minister of religion and education (1848-51). Author of Omscula Academica (1834-42) and Livserind ringer (1887).

Mæander, riv., Asia Minor. It rises in Phrygia, flows between Lydia and Caria, and falls into the Ægean Sea. Its windings have made its name proverbial. The modern name is Menderes. Its length is 240 m., and it frequently overflows its banks.

Mæcenas, GAIUS CILNIUS (between 73 and 63 to 8 n.c.), friend and adviser of the Roman emperor Augustus, was of an Etruscan family of Arretium. In 42 n.c. his services were used in negotiating with Antony. During 36-34 L.C. he was entrusted with the Laintenance of order in Rome and Italy; and also in 31 n.c. when he quashed the conspiracy of the younger Lepidus. He is, however, more famous as a literary patron. Virgil, Horace, and Propertius were among his friends, and received many benefits at his hands.

Maelström, an ocean current between the Norwegian islands Mænades. See BACCHE. Maerlant, JAROBVAN (d.c. 1291), Flenish poet, born near Bruges; translated Bénoît de Ste.-More's Roman de Troie, but subsequently established a great reputation through his own lyrical compositions. Author of Spieghel Historiael ('The Mirror of History') and Rijmbijbel ('Rhyming Biblo'), the latter causing grave displeasure to the bishop of Utrecht.

280 ft. in circumference. Its artificial nature was not known to modern people until 1861. It consists of a room 15 ft. square, with three small lateral chambers. Runic inscriptions on the walls prove that the mound was broken into by Norsemen in the 12th century. Who were its actual builders is unknown. On the brow of Kewing Hill (parish of Firth), a few miles from Maes-How, is a similar but considerably smaller structure, examined by Mr. M. Charleson, Stromness, in 1901.

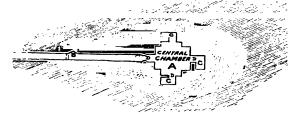
son, Stromness, in 1901.

Maestricht. See Maastricht.

Maestricht Beds belong to the uppermost subdivision of the Cretaceous system in Belgium, and have probably no representative in the British Isles, except the Chalk of Trimirgham in Norfolk. It is a soft, almost tufaceous limestone, and is full of fossils, especially of Bryozoa.

of fossils, especially of Bryozoa.

Macterlinck, MAURICE (1862), Belgian dramatist and essayist, was born at Ghent. His thought has been greatly influenced by Novalis and Emerson. His first volume, consisting of verse, with the title Serres Chaudes, appeared in 1889, and was followed by Douze Chansons (1897). He has also written dramas - La Princesse Malcine (1889), Les Avengles and L'Intruse (1890), Les Sept Prin-cesses (1891), Pelléas et Mélisande (1892), Alladine et Palamides, Intérieur, and La Mort de Tinta-giles (1894), Aglaraine et Sélysette (1896), Sœur Béatrice and Ardianc et Barbe Bleue (1901), Monna Vanna (1902), and Jouzelle (1903). His other works include a trans-lation from the Flemish of Van Raysbroeck, entitled L'Ornement des Noces Spirituelles (1891); a translation from Novalis (1895); two volumes of philosophical essays, Le Trésor des Humbles (1896) and La Sagesse et la Destinée (1898); La Vie des Abeilles (1991); and La Tenvola des Abeilles (1991); and La Tenvola Abeilles (1901); and Le Temple Enseveli. A number of these works have been excellently translated into English by Sutro. Mae-



Plan of Macs-How, Orkney Islands.
A. Central chamber; B. recess; c, cells; D. doors.

Macs-How, an earth-covered building of stone, about a mile N.E. of the standing stones of Steunis, in the main island of the Orkneys, Scotland. Outwardly itis a grassy mound 36ft. high, and terlinck's dramas are not dramas of action but of thought, but he makes a very real drama of the mind, painting human nature in vivid colours. His plays are pervaded by melancholy, his characters suggesting a vain struggle in the inexorable web of fate. See W. L. Courtney's The Development of M. Maeterlinck (1904); A. van Bever's Maurice Maeterlinck (1904); and critical studies in German by Jacobs (1901) and Miessner (1904).



Maurice Maeterlinck.
(Photo by C. Gerschel, Paris.)

Mæviad. See BAVIAD. Mafeking, tn., Bechuanaland, British S. Africa, 200 m. N. of Kimberley, on the Cape Town-Bulawayo Ry. It was ineffectually besieged by the Boers from Oct. 11, 1899, to May 18, 1900. Pop. of dist. (1904) 21,436.

Maffel, Francesco Scipione, Count (1675-1755), Italian writer, was born at Verona. His tragedy, Merope (1714; Eng. version by Ayres, 1740), is generally regarded as having brought about the revival of tragedy in Italy. As a scholar, Maffei shines most in the Istoria Diptomatica (1727), Verona Illustrata (1732), and Osservazioni Letterarie (1732 40). His Opere were published in 21 vols. at Venice (1790).

Mafia, a secret society in Sicily. Its members are bound to avenge and protect one another if punished for brigandage or crime by the authorities. The government, though putting down its more violent manifestations, has failed to crush the secret organization of the society. See Outrera's La Mafia (1903).

Maira, tn., Estremadura prov., Portugal, 18 m. N.w. of Lishon; famous for its monastery and royal palace, built in 1717 by John v. in imitation of the Escorial, and now used by the military authorities. Pop. (1900) 4,794.

Magadha, ancient kingdom of India, corresponding to the modern Behar and Oudh. Its capital, Pataliputra, was on the Ganges. possibly where Patna now is. One of its kings, Bimbisara, was the friend of Buddha in his early days.

Magadoxo. See Mogdishu. Magalhaes, Fernao de. See Magellan.

Magallanes, territory, Chile, lying S. of lat. 47° S. Area, 75,292 sq. m. Much of it is mountainous and forest-clad. The chief settlement is Punta Arenas, on the Strait of Magellan. Wool is the only export.

Wool is the only export.

Magazine of Art, The, was founded in 1878 by Messrs.
Cassell and Co., with Mr. A. J.
R. Trendell as its first editor. Among its early contributors were Sir Wyke Bayliss, Honry Blackburn, A. H. Church, and Percy Fitzgerald; while original drawings were made by Sir John Millais, Randolph Caldecott, and Percy Macquoid. In 1881 the editorship passed to Mr. W. E. Henley, who brought with him a brilliant train of contributors, including Robert Louis Stevenson, Richard Jefferies, Sidney Colvin, Andrew Lang, and Austin Dobson. Mr. Henley resigned in 1886, and was succeeded by Mr. M. H. Spielmann, but publication stopped in July 1904. In 1888 the magazine published the first of the special supplements of Royal Academy Pictures' (now continued as a separate publication); and in 1893 and 1894, a winter supplement. Pictures of the Year. European

Magazines. Although a numher of short-lived literary periodicals were produced in the latter part of the 17th century, the modern magazine may be said to have had its beginnings in 1731, when Cave brought out the Gentleman's Magazine. It was followed in 1739 by the Scots Magazine (afterwards the Edinburgh Magazine) and by several other publications of sectional interest, like the Wesleyan Methodist Magazine; but the future importance of this form of publication only began to be recognized when Blackwood's (Edinburgh) Magazine appeared in 1817. This became at once one of the great literary and political influences of its day. Fraser's Magazine (established in 1830, and changed in 1882 to Longman's Magazine; discontinued in 1905) was famous for containing many contributions from Thackeray and Carlyle; but a greater landmark in the history of magazine literature is to be found in the establishment of Tait's Edinburgh Magazine (1832), when the price was first reduced from two shillings and sixpence to one shilling. In Bentley's Miscellany (1837)-afterwards incorporated with Temple Bar (1860)—is to be found the first example of a magazine devoted purely to light

literature; and it was followed by a great development of cheap weeklies and miscellanies, of which the most famous are Chambers's Journal, Household Words (edited by Dickens), All the Year Round, and Once a Week, of which only the first named survives. In 1860 the Cornhill Magazine was produced under Thackeray's editorship, and for many years occupied a unique place in periodical literature—a place that was only challenged on the appearance of the illustrated magazines in the early 'eighties. In this direction the Americans had taken the lead, Harper's, Scribner's, St. Nicholas, M'Clure's, Munsey, and Century carrying the art of illustration by process work to a point unattempted in Britain, except in such special publications as the Art Journal (1849) and the Magazine of Art (1878). In 1883 the English Illustrated Magazine was begun, to emulate American enterprise; and soon afterwards the Pall Mall Magazine reached a high level of artistic excellence. In 1891 the Strand Magazine was published at sixpence, offering light and attractive fiction, profusely illustrated: and it attained a vogue which produced a crowd of imitators, such as Harmsworth's, Pearson's, the Royal, the Windsor. Threepence (Lady's Realm) is the lowest price at which the popular magazines of the day are sold. Be-tween 1884 and 1902 the monthly publications issued in London increased from 699 to 1,010.

Magazines, Field, small chambers in field-works for the safe storage of powder and annumition. They are usually placed either in the interior of thick parapets or of traverses, or else built up against their inner (revetted) slopes. All magazines should be carefully drained.

Magdala, tn. and hill fort near the centre of Abyssinia, s. of Lake Dembea, 150 m. s.e. of Gondar, on a huge, steep, isolated mass of basalt 3,300 ft. above the Beshilo. It was stormed (April 13, 1868) by the British under Sir Robert Napier.

Magdalena. (1.) Department, Colombia. A branch of the E. Cordillera runs along the E. side, separating the basin of Lake Maracaibo from that of the Magdalena R. It contains coal fields. Santa Marta is the capital. Area, 24,440 sq. m. Pop. 100,000. (2.) River, Colombia, running from its 8. boundary to the Caribbean Sea. It has a length of 1,060 m., and drains a basin of 95,880 sq. m. At Neiva, 750 m. from its mouth, it becomes navigable by steamers. But at Honda navigation is interrupted by the great rapid, El Salto; consequently a railway, 21 m. long,

has been constructed to connect the upper and lower Magdalens. Of the tributaries the most important are the Saldana, Sagamoso, Lebrija, and Cauca.

Magdalene, Mary. See Mary Magdalene.

Magdeburg, tn., Prussian prov. of Saxony, 88 m. by rail w.s.w. of Berlin. It is intersected by the Elbe, is strongly fortified, and is a commercial centre. Its industries comprise shipbuilding and the construction of engines, machinery, armour-plate, and ordnance. The principal articles of commerce are sugar, chicory, and tobacco. Wood is imported in large quantities from Russia and Poland. The eathedral, a Gothic structure, containing the tombs of the Emperor Otto I. (d. 973) and the Empress Editla, was

and Poland. The cathedral, a Gothic structure, containing the tombs of the Emperor Otto I. (d. 973) and the Empress Editha, was built in the 13th century. A new municipal museum for industries and art was opened in 1904. In 937 a Benedictine monastery was founded here; thirty-one years later it was raised to an archbishopric. During the Thirty Years' war, in 1631, the town was taken by the imperialists under Tilly, who cruelly ravaged it with fire and sword. In 1648 the archbishopric was converted into a duchy and given to Brandenburg. In 1806 Magdeburg capitulated to the French under Marshal Ney. Sudenburg, Neustadt, and Buckau, formerly independent

Magee, WILLIAM CONNOR (1821-91), archbishop of York, was born at Cork in Ireland. In his day, as an orator, debater, and conversationalist, he had few equals. He was successively dean of Cork (1864), bishop of Peterborough (1868), archbishop of York (1891). He was respected as a clear headed exponent of masculine Christianity and a defender of the privileges of the

towns, are now united in the municipality of Magdeburg. Pop.

(1905) 240,661.

as a clear-headed exponent or masculine Christianity and a defender of the privileges of the Irish Church, but held heterodox views on the condemnatory clauses of the Athanasian creed.

Magelian, STRAIT OF, between Tierra del Fuego and the mainland of Chile. Its length is 360 m., while its breadth varies from 2½ m. to 17 m. It was discovered in 1520 by Magellan, and explored by the Beagle in 1826 36. The only important harbour is Punta Arenas.

Magelian, FERDINAND—in Portuguese FERNAO DE MAGALHAES—(?1470-1521), Portuguese navigator and explorer, was born probably at Villa de Sabrosa in Tras-os-Montes. He distinguished himself in the Indies and Malacca, as also in Africa (1510-12); but losing the king's favour on his return, he offered his services to Charles v. (1517). Aided by him, Magellan (1519)

crossed the Atlantic to Brazil (Rio), quelled a dangerous mutiny at San Julian, and discovered the strait called by his name. He then traversed and named the Pacific, and reaching the Philippines, fell in fight with the natives of Matan. See Stanley's First Voyage round the World by Magellan (Hakluyt Society, 1874); Guillemard's Magellan and the Pacific (1891); Butterworth's The Story of Magellan (1899).

Magellanic Clouds, two round patches of milky light near the spole of the heavens, described in 1516 by Andrea Corsali, the navigator, and named after Magellan. The Greater Cloud is situated in the constellation Dorado. The Lesser Cloud lies in a blank space between Hydrus and Toucan. See Knowledge, xiv. 51, and Harvard Circulars, Nos. 82, 96

Magendie, Francois (1783-1855), French physiologist, born at Bordeaux; was professor of anatomy at the Collège de France (1830), and member of the Academy of Sciences. He studied the action of various new drugs on animals and the human body, and particularly advanced our knowledge of nerve function. Author of Formulaire pour l'Emploi et la Préparation de plusieurs Noureaux Médicaments (1821), and Leçons sur les Fonctions et les Maladies du Système Nerveux (1839); edited (1821-31) Journal de la Physiologie Expérimentale. See C. Bernard's François Magendie (1856).

Magenta. See FUCHSIN.
Magenta, tn., prov. Milan,
Lombardy, Italy, 15 m. w. of
Milân; has manufactures of silk
and matches. It was the scene
of the victory of the French and
Sardinians over the Austrians,
June 4, 1859. Pop. (1901) 8,012.

Maggiore, or Locarno, Laco, lake, lies mainly in North Italy, and is nearly 40 m. in length, and from II m. to 3 m. in breadth. It is very irregular in shape, and has an area of 82 sq. m.; its greatest depth is 1,221 ft., and its altitude is 636 ft. The upper part is called the Lake of Locarno, and belongs to the Swiss canton of Ticino. Opposite Pallanza are the Borromean Is., a famous winter resort.

Maggot. A typical maggot is an insect larva in which legs are absent, and the head is not distinctly defined from the body. Such an animal hatches from an egg deposited by the parent in the midst of an abundant food-supply. A good example is the maggot of the common blue-bottle fly. As such maggots live concealed, and are typically colourless, the term is often applied by analogy to all insect larve of similar habit whatever their structure—for ex-

ample, the 'maggots' of plums are the caterpillars of the moth Graptolitha funebrana.

Magi, the priestly caste among the ancient Medians, and later also among the Persians. Magism is a worship of the elements, particularly of fire; and the Magi pretended to possess supernatural powers, whence our word magic. On the accession of the Persian Darius to the throne in 521 B.C., many of the Magi were massacred. Their headquarters were at Pasargadæ. It is suggested that the Magi were of Scythian origin, and became incorporated with the Medes.

Magic is the supposed super-natural art, or art of controlling the actions of spiritual or superhuman beings. It is divided into - (1.) Black magic, which is evil magic, or magic used with evil purpose-for example, to harm others or bring evil upon them. The evil eye and the use of evil spells come under this heading. (2.) Natural magic, which is the making use of superior knowledge of the powers of nature to work wonders-for example, the knowledge of chemistry and magnetism possessed by magicians in the middle ages enabled them to work natural magic. (3.) White magic, or the magic vsed for good purposes—as, for instance, for healing the sick or curing diseases by means of spells. White magic did not deal with witchcraft, sorcery, evil spirits, or enchantment. (4.) Celestial magic, or the supposed supernatural power that gave spirits influence over the planets, and the planets influence over human destiny. Astrology comes under this heading. (5.) Superstitious or goetic magic, or the invocation of devils and a supposed agreement between them and man, whereby they con-sented to serve him in his ends in return for some service by him. Magic is a very old science. In ancient Babylonia and Egypt it flourished side by side with religion. In classical times magic became known as sorcery, and the magician was believed to hold communication with the unseen world. When Christianity spread, the gods of the heathen world were declared to be demons, with whom no converse should be held by good Christians. Amongst native races magic has always had influence, as among the Australian natives, who attribute to magic the various conditions of their health. If a man dies, it is by the magic of some enemy, and rarely from natural causes. In South America the native smokes narcotics, and generally brings himself into a state of spiritual intoxication, when he will prophesy good or evil, work spells, and exorcise spirits. In Africa

there is the medicine-man and rain-maker, who has power over life and death, and can influence the elements at will. India swarms with soothsayers, astrologers, and magicians; but these are different from the sorcer-ers, who live on their dupes. Amongst Mohammedans the belief in magic is rife, but it extends only to a belief in the efficacy of amulets, charms, exorcisms, and spells. Egypt and Chaldea were the original homes of magic, and it is from the magic practised in those countries that all later practices have sprung. Amongst the Egyptians good magic-that is, magic for curative purposes - was much used; but black magic was considered a crime. Magicians were believed to have power over all nature animate and inanimate, and to have power to reinfuse life into the dead. To the magician the future was as well known as the past, and the thoughts of all were an open book. In Chaldaa, Assyria, and Babylon magic was chiefly astrological; the magicians studied the stars and gave horoscopes on the birth of all children. Greek magic consisted in the consultation of oracles and in the working of charms and spells. Roman magic consisted in divination and the drawing of signs from portents. Philosophic and theurgic magic was much used by the Jews, and Hebrew words came to be used when spells were worked. The pentagram became a sign of the brotherhood of magicians from this variety of the art. In all magic the influences of hostile action on the part of those who were implacable could only be terminated by the use of an amulet, secret name, magical formula or figure. In Egyptian magic each member of the body was placed under the protection of some amulet. Amulets were in numerous cases inscribed with magic formulæ. See Horst's Zau-berbibliothek (6 vols., 1820-6); Tylor's Primitive Culture (ed. 1903); Lenormant's Magic among the Chaldeans (Eng. trans. 1877); Conway's Demonology and Devil Lore (1878); V. Rydberg's Magic of the Middle Ages (Eng. trans. 1879); Fabart's Histoire...de VOcculte, Mayie, etc. (1885); and Adam's Witch, Warlock, and Mayician (1889). See also Con-JURING, DIVINATION, WITCH-CRAFT.

Magic Lantern. See OPTICAL PROJECTION.

Magic Squares consist of numbers set in a square in such a manner that the sums of the numbers in a row, column, and diagonal, are the same. In Fig. 1 five numbers are thus arranged. It will be noticed that each number occupies cells connected by

the knights' move in chess, and when the square is crossed the next cell may be taken in a contiguous square, and then the number may be moved to the corresponding cell in the original square; but other paths may be taken. Squares with different numbers in each cell may be formed by making another square

1	11	17	29	43
29	43	1	11	17
11	17	29	43	1
43	1	11	17	29
17	29	43	1	11

Fig. 1.

with four numbers, and adding the numbers in corresponding cells. This is De la Hire's method. Bachet arranged his numbers as in Fig. 2, and then transferring those outside the square to the corresponding compartments within

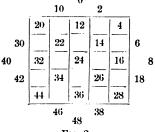


Fig. 2.

it, obtained a magic square, as in Fig. 2a. If one of the columns or rows in Fig. 1 be moved to the other side of the square, the properties of the square will not be changed; and if the path of the knight in chess be followed from

20	46	12	38	4
6	22	48	14	30
32	8	24	40	16
18	34	0	26	42
44	10	36	2	28

FIG. 2A.

the corner containing 17, we get 11 in the second row, and 1, 43, and 29 in the others. Such a square is called Nasik, after a town in India, where the inventor, Rev. A. H. Frost, resided. They may be made so that the paths along n-1 paths from a corner cell (n being the number of cells in the side of the square) may

contain constant sums, and so that the sum of any two tigures equidistant from the middle one may be any given multiple or fraction of the latter; and other combinations may be arranged. Squares with an even number of cells require special adjustments; they also can be made Nasik.

Magilus, a genus of gasteropod molluses, the members of which live among corals. They become gradually sunk in the coral, and would soon be entirely buried were it not that they possess the power of producing the shell into a tube whose growth keeps pace with that of the coral. The process goes on until the shell loses all trace of its original shape, its whorls being filled up with lime, while the animal occupies the

tubular prolongation.

Maginn, William (1793-1842), Irish journalist and critic, was born at Cork. Established in London in 1823, he carried on editorial and journalistic work, producing at the same time The City of the Demons (1828), a story which was one of his best achievements. In conjunction with Hugh Fraser, he founded Fraser's Magazine in 1830, Maginn's own Homeric Ballads and Gallery of Literary Characters, illustrated by Maclise, appearing in it. Owing to intemperance and a lack of conscientiousness, except in scholarship, Maginn died in great poverty. See Memorir in Dublin University Magazine (Jan 1844)

poverty. See Mcmoir in Dublin University Mayazine (Jan. 1844). Magister equitum, 'the master of the horse,' an official in the Roman state, who, in the time of the kings, commanded the cavalry; under the republic he only existed when a dictator was

appointed.

Magliabecchi, ANTONIO (1633-1714), Italian bibliomaniac and librarian, famous for his extraordinary memory, learning, and eccentric habits, was a native of Florence. He became (1673) librarian to the Grand - Duke Cosimo III. and his successors. At his death he bequeathed his

At his death he between the library to the city of Florence.

Magna Charta. The Great Charter, called by Hallam the keystone of English liberty, was granted by King John at Runnymede in the year 1215. In addition to the preamble, the Charter contains sixty-three clauses, and is partly remedial and partly, as Coke says, declaratory of the principal grounds of the fundamental laws of England. Its principal provisions are:—(1.) A declaration that the Church of England is free. (2.) Feudal obligations are defined and limited. (3.) Law courts are to be held at fixed places, assize courts are established, and earls and barons are to be tried by their peers. (4.) No extraor-

dinary taxation without consent. (5.) No banishment or imprisonment save by judgment of peers and the law of the land. (6.) No denial, sale, or delay of justice. (7.) One standard of weights and measures. The Magna Charta was confirmed many times by different kings, and the form which appears in the Revised Statutes is the confirmation by Edward I. in 1297. See M'Kechnio's Magna Charta (1905).

Magnesia. See MAGNESUM. Magnesia. (1.) M. AD SIPYLUM, city, at the foot of Mt. Sipylus, N. W. Lydia; near it Scipio Asiaticus defeated Antiochus the Great of Syria in 190 B.C. (2.) M. AD Mæander, S. W. Lydia; was destroyed by the Cimmerians about 700 B.C., and rostored by Milesian colonists.

Magnesian Limestone contains a variable percentage of magnesium carbonate. The term is also used as synonymous with dolomite. The magnesian limestone of the north of England belongs to the upper subdivision of the Permian system, and attains its greatest thickness in Yorkshire and Durham. It is usually a pale yellow rock, containing few fossils, and yielding beds which are admirably adapted for building purposes. It was adopted for the Houses of Parliament. Quarries are worked at Mansfield and Bolsover.

Magnesite, a mineral consisting of magnesium carbonate. It bears a close resemblance to calcite, except that it is less easily soluble in acids and shows far less variety of crystalline forms. It occurs mostly as a secondary product associated with serpentine, is soft (h. = 35 - 45; sp. gr. 37), effervesces with dilute acids, and is used as a source of magnesium compounds and for the preparation of the magnesia bricks, obtained by calcination, and employed for furnaces where a basic lining is required.

Magnesium (Mg 24'36), a metallic element occurring, very widely distributed, in nature in combination, as magnesite (MgCO₃), dolomite (MgCa)(O₃, Epsom salts (MgSO₄/H₂O), carnallite (KClMgCl₂OH₂O), kieserite (MgSO₄H₂O), and kanite (KClMgSO₄3H₂O). Magnesium was formerly obtained by the action of sodium on dried carnallite, but is now prepared by electrolysis. The carnallite is fused by external heating in a cylindrical steel vessel, which is made the cathode of the dynamo, the anode being a carbon rod in a perforated porcelain cylinder that is immersed in the melted electrolyte. The magnesium separates at the cathode and rises to the surface, while the chlorine is

set free at the anode, and is collected in the porcelain cylinder and led off. Magnesium is a light (sp. gr. 17), white, hard, and fairly tough metal, that melts at 633° c and boils about 1000°. It tarnishes but slightly when exposed to the air, but if heated catches fire and burns with a dazzling white light, forming the oxide. It is thus used for pyrotechnic purposes; and as the light contains a good proportion of rays of higher refrangibility, magnesium ribbon, and particularly powder ('flash-lamp'), is much used for photography by artificial light. Magnesium is artificial light. Magnesium is also used as a reducing agent, to render nickel castings sound, and along with aluminium to form a valuable alloy, magnalium. Of the compounds of magnesium, that termed magnesia is properly the oxide, MgO; but the name is also applied to the basic carbon-ates. These compounds differ somewhat according to the methods of preparation. The following are the principal commercial varieties: Light magnesium carbonate or magnesia alba levis, prepared by mixing cold dilute solutions of sodium carbonate and magnesium sulphate; and heavy magnesium carbonate, obtained when the solutions are concentrated and evaporated to dryness. Both are basic carbonates, approximating to the formula 3MgCO₃, Mg(OH)₂, 4H2O. Both are white powders, soluble in acids with effervescence, and mainly differing in their density. On calcination they yield the oxide, a white powder that does not effervesce with acids, and differs in density according to the carbonate it is prepared from, the two forms being magnesia usta levis and ponderosa. Sulphate of magnesium or Epsom salts is a white crystalline solid that is soluble in water and present in many mineral springs. Magnesium chloride is a deliquescent and very soluble salt that gives off hydrochloric acid when evaporated; a reaction is employed to prepare the latter substance. Magnesium chloride is also utilized to weight cotton goods. Both the carbonates, the oxide, the sulphate, and their preparations, such as 'fluid mag-nesia,' which is a solution of the bicarbonate in water containing carbon dioxide under pressure, and 'citrate' of magnesia, act as saline purgatives; the oxides and carbonate are also mildly alkaline. Of the rest of the magnesium compounds the natural silicates, such as asbestos, soapstone ('French chalk') and meerschaum are the most useful.

Magnetic Pole. See Magnet-ISM, TERRESTRIAL.

Magnetic Units. See Units.

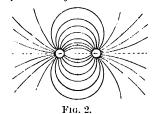
Magnetism. The natural magnet, lodestone or loadstone. called by mineralogists magnetite or siderite, the black or magnetic oxide of iron, was known to the ancients, and certain of its properties ascertained. Lumps of it tend to set themselves with a certain line in them approximately north and south; if dipped into filings of iron, these collect in a cluster round two places which are the ends of the above-mentioned line, and these two patches exert attraction or repulsion on similar patches on other lode-stones. The patches are called the 'poles' of the magnet, and the line is the magnetic axis. If a strip of hard steel is rubbed from the centre to one end with one pole, and from the centre to the other end with the other pole of the lodestone, it is found to take on all the properties of the lodestone, and the end rubbed with the north-seeking pole turns to the south, and vice versa. The north-seeking poles are found to repel each other, and south-seeking poles repel each other, while north poles attract south poles. Such a strip of steel, if mounted on a pivot, forms a magnetic needle or mariner's compass. Such a bar magnet, if lipped into iron filings, will attract a bunch. thick at the ends, and thinning rapidly towards the middle. The strength of the pole is measured by the mechanical force it exerts on a similar pole, the unit pole being taken to be one that will exert a force of one dyne on a pole of the same strength placed at on: centimeter distance. was shown by Coulomb that the force is inversely proportional to the square of the distance from the pole.

The Magnetic Field.—The influence of a magnet extends out in all directions, and its sphere of influence is called its magnetic field. Its form was investigated by Faraday by the sprinkling of iron filings over a sheet of card or glass laid over a magnet. When the sheet is tapped, the filings arrange themselves in strings, which radiate out approximately from each end of the magnet, bending round, some in small, others in large curves, to join those from the other end. These lines are called 'lines of force,' as they indicate the direction of the combined magnetic forces from the two poles, and in general they take the form shown in Fig. 1, where the dotted lines indicate the direction of the force in the air, and the full lines inside the bar represent their assumed direction in the magnet. In a real magnet it will be seen that the magnetism is not confined to the ends, but spreads over a considerable length. But for purposes of calculation it is convenient to consider the magnetism as concentrated at a point, and accordingly a point is selected near to each end, which will give the same magnetic effect on distant objects as the actual magnetism would do. These are



Fig. 1.

called the 'virtual poles,' and the distance between the two points is called 'the virtual length' of the magnet. The virtual length is from three-quarters to five sixths of the real length, according to the shape of the bar. The lines of force of a virtual magnet are supposed to radiate out from the points (Fig. 2), and hence do not exactly correspond to those of a real magnet, but at a distance they are identical with those of Fig. 1. These lines of force may be drawn to represent not only the direction of the magnetic force, but also its intensity. Thus at points close to the poles the field is very intense, but the strength rapidly diminishes with distance from the magnet, and on account of the partial neutralizing effects of the two poles on each other the strength of field due to a magnet is inversely proportional to the cube of the distance along a straight line drawn through the centre of the magnet. give a numerical value to the lines of force, the unit strength of magnetic field is taken as that produced at one centimetre distance from the unit pole, and is represented by one line of force



through each square centimetre. Hence there will be 4π lines of force issuing from unit pole, since the area of a sphere of unit radius is 4π .

Magnetic Moment.—It can be shown that the influence of a magnet is proportional to the strength of the poles and to the virtual length. This product is called the moment of the mag-

net.' If a small magnet is placed at a point some distance from a large magnet, so that the lines of force may be considered sensibly straight over the short distance of its length, the mechanical action is a couple tending to turn the little magnet to a position parallel to the lines of force. In Fig. 3, if H is the strength of the field, a force Hm acts on each pole of strength m, and the moment of the couple is $Hml \cos \theta$ or M H cos θ , where M is the moment of the magnet. The strength of field is proportional to M/d^3 at a point distant d centimetres from the centre; but the exact value depends on the direction of d with respect to the magnetic axis, cr. in other words, to the value of the angle θ between the line from centre to the little magnet and the plane perpendicular to the axis.

Magnetometer. — The moments of magnets may be compared by the magnetometer, which is simply a small pivoted or suspended magnet needle with a



long pointer. This normally lies north and south. If a magnet is placed east or west of this, pointing towards it, the needle will be deflected through an angle θ ,

when $\frac{2M}{d^3} = N \tan \theta$, if H is the magnetic field due to the earth. Thus the deflections caused by different magnets are a measure of their respective moments. Magnets may also be compared by suspending them and causing them to oscillate about the axis of suspension. If the suspension thread is so thin that it exerts no appreciable torsional force, the time of a swing is proportional

to $\sqrt{\frac{K}{MH}}$, where K is the mo. ment of inertia, and H is the magnetic field of the earth.

Magnetic Action of a Current.

—Oersted in 1820 found that there was a magnetic field round any conductor through which an electric current was passing. With a long straight conductor the lines of force form circles with the conductor as centre, and the strength of the field is proportional to the current, and inversely as the distance from the centre of the conductor. If the conductor is bent into a circle, the lines of force pass through the inside of the circle, and return on the outside. Setting up

a succession of circles on the same axis, with the current passing in the same direction in each, the lines of force will pass along the tube thus formed, returning outside. Such a succession of circles carrying a current is called a 'solenoid,' and is closely imitated by a coil of wire. It is found that the lines of force form much the same diagram as is shown in Fig. 1, with the addition that they can be identified inside of the tube as well as outside. The only difference is that they bend off in smooth curves instead of abrupt angles. Thus a solenoid will behave in all respects like a will behave in all respects like a magnet, and its strength is proportional to the current and to the number of coils. The direction of the lines of force (i.e. the direction in which a north pole would be driven by them) depends on the direction of the current. In a straight wire, the direction of rotation of a righthanded screw (a cork screw) gives the direction of the lines of force, if the current passes in the direction in which the screw is travelling. Also in a solenoid the lines of force pass along the direction of travel, if the current passes round in a right-handed rotation. The end at which the lines of force emerge is the north pole of the coil, the other being the south pole. Such a magnet is called an electro-magnet.

The power of an electro-magnet is greatly intensified if the inside of the coil is filled with soft iron. and to a lesser extent if hard steel, nickel, cobalt (metal), or the magnetic oxide of iron is used. The iron is said to be magnetized by the coil, or to show 'induced magnetism,' and the magnetism so induced adds its magnetic effect to that of the coil. It was shown by Beetz that the molecules of iron are themselves magnets by nature, and that the absence of magnetic action by iron in the ordinary state is due to the mutual neutralization of the molecular magnets. But under the influence of an additional magnetic force, such as is due to a coil of wire carrying a current, the little magnets arrange themselves in regular order with consecutive north and south poles, and thus their magnetic effects are added together instead of neutralizing one another.

Ewing's Theory of Magnetism.

—Professor Ewing has shown that the mutual influence of the molecular magnets on each other will explain all the phenomena of magnetism in iron and other magnetic materials. The chief phenomena are as follows: when a very weak magnetic force is applied to the iron, the resulting magnetism is feeble, and is proportional to the force. An in-

crease in the force produces a very large increase in the magnetism; but a further increase is less and less effective, until the iron ultimately reaches a condition of magnetic saturation. There are thus three distinct stages, which correspond to three conditions of the molecular magnets. To begin with, the particles are arranged in mutually

neutralizing positions (Fig. 4). A feeble force draws them slightly apart (A), as shown in the dotted lines, producing a small magnetic effect. But with a stronger force the attraction of some of the poles is overcome, and the particles swing round to a new position (B), which has a much larger magnetic resultant, but the particles still influence one another to a certain extent.

But with very soft pure iron the magnetism is completely lost if the iron is jarred. Short thick pieces lose their magnetism very easily, because the lines of force from the poles endeavour to return through the metal, and in so doing tend to reverse the magnetism. Thus, a bar may be regarded as made up of a number of thin bars, all with their north poles together, and each north pole tends to demagnetize the neighbouring ones. If the piece is very thin in relation to its length, this effect is much diminished, since there would not be so many component pieces, and therefore magnets are preferably made long and thin if they are required to be permanent.

Forms of Magnets.—The straight bar magnet is often used for convenience, but it is not so permanent as the horseshoe form. For in this the two poles are brought near together, and the lines of force pass directly across

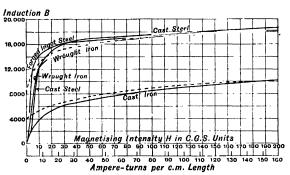


Fig. 5

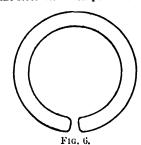
Finally, with a very strong force, the particles are arranged completely parallel to the force (c), and the maximum magnetic effect is produced. The positions of different sets of particles will probably vary, and hence the change is not quite sudden, but shows a gradual alteration. If a curve is drawn, in which ordinates represent the magnetization produced, and abscissæ represent thestrength of the magnetic force, the shape of the curve is always similar to those shown in Fig. 5. Different qualities of iron and steel show varied details, but the general shape is recognizable in all.

Residual Magnetism.—If a piece of iron so magnetized is removed from the coil, it is found to retain a portion of its magnetism. This is called 'residual magnetism.' In a long piece of hardened steel the magnetism is retained with very little loss for many years, and a moderate amount of jarring affects it but little.

the narrow air gap, with less tendency to return along the metal. A circular magnet with a narrow space between the poles (Fig. 6) affords a very permanent form. Another form is the tubular magnet (Fig. 7), in which one of the limbs envelops the other, and the air gap becomes a narrow ring round the centre pole.

Keepers.—The tendency to self-demagnetization can be much reduced by bridging the gap with a piece of soft iron, called a keeper. Although a high grade of tool steel makes excellent magnets, the addition of tungsten or chromium improves the steel, rendering the magnet more lasting. The metal is hardened by rapid cooling from a red heat; but where great constancy of strength is required, as in some forms of electric measuring instruments, a slight tempering is advisable. The magnets are boiled in oil and magnetized several times in succession.

Magnetization of Magnets.— Small magnets, such as compass needles, can be made by stroking the steel with each pole of a bar



magnet in turn. But a more uniform magnetization can be obtained by placing the little magnets between the poles of a power ful electro-magnet of horseshoe shape. Very long magnets are put into a coil of wire, and s powerful current is sent round the coil for a second or two. Horseshoe magnets can be dealt with in the same way by using suitably-shaped coils. For large magnets it is preferable to build up the magnet out of many thin strips of steel of the shape required, each separately magnetized. By this means the whole of the material becomes equally magnetized throughout.

Hysteresis.—The retention of the magnetic state produces a very important effect when the iron is subjected to a changing magnetic field. Let the magnetic field be produced by an alternating or reversing current. Then the direction of magnetization will be reversed at every reversal of the current, and the change will take place gradually. If a cycle of magnetization is followed through, it will be seen that, owing to the residual magnetism.

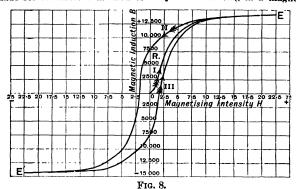


Fig. 7.

the iron will remain magnetized when the current has died down to zero, and only reverses by the application of a greater or smaller force. The same effect occurs at the next change, so that the state of the iron always lags behind the state of the magnetic field. The effect is called 'hysteresis.' In a diagram the magnetization curve is seen to be a closed one (Fig. 8); and as the magnetic field is of the nature of a stress, and

the resulting magnetization is a strain, the closed curve indicates work done on the iron, which is converted into heat in the metal. By a rapid alternation of the force the temperature quickly rises, and in machinery, when this occurs, due allowance must be made for an efficient method of

swing round to a reversed condition of 2, with gradually increased alignment up to E'. Then the same phenomena occur in the second half of the cycle. A strong verification of Ewing's theory was afforded by Baily's discovery that the hysteresis in a cylinder rotating in a magnetic



cooling. If the values of H, the force, and I, the intensity of magnetization, are expressed in C.G.S. units, then the area enclosed gives the loss of energy per cycle in ergs. The more strongly the iron is magnetized the greater is the loss, and Mr. Steinmetz has shown that it is approximately prop rtional to a B1.6, where B is the magnetic induction. In hard steel the coefficient a is large, whereas in very pure soft iron and in certain mild steels a is small. Fig. 9 shows several curves obtained from different qualities of metal. Very careful annealing is essential for low values of this; and since this effect reduces the efficiency of transformers and dynamos, every care is taken to use the softest Swedish iron in all places where the magnetism is periodically reversed. The value on (Fig. 8) is called the 're-tentiveness,' and on the 'coercive force.' In hard steel the coercive is great; but the retentiveness of soft iron is often greater than that of hard steel, though a very small force is sufficient to destroy it. The explanation of this is easily seen from Ewing's theory. After state 2 a new arrangement of particles is produced, which is fairly stable, and the which is fairly stante, and the particles in consequence keep themselves substantially in the same position, while the force falls to zero. Hence, though there is some falling off of the magnetic state from E to R (Fig. 8), the iron is still fairly strongly magnetized. But as the force increases in the reverse direction, the attractions are gradually weakened, until there is another

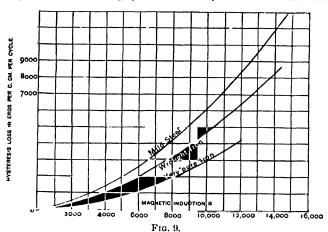
revolution, and the particles

field reached a maximum value at an induction of some 16,000, and rapidly diminished for higher values, becoming zero when the iron is saturated. In this condition the molecular magnets are never allowed to form new combinations, since the magnetic field only changes in direction, but not in strength. Therefore each molecule rotates individually as the field changes, and

that an electric current circulates in the atom. The modern view of the electric constitution of matter supports this view, while modifying the idea of a current into a circulation of electrons,

Effect of Temperature.—If iron is heated it becomes more and more susceptible to magnetism. but the saturation value becomes less and less. Both effects con-tinue up to a red heat, when it suddenly ceases to be affected by a magnetic force, and it becomes no more magnetic than the nonmagnetic metals. On cooling, it again becomes magnetic; but Dr. J. Hopkinson showed that some alloys of iron remained non-magnetic on cooling to quite low temperatures, then suddenly regaining their magnetic properties. After heating to a red heat, all residual magnetism disappears, and the iron, after cooling, is completely demagnetized. Long-continued moderate heating has the effect of increasing the coercive force and the hysteresis loss. a temperature of 100° Centigrade prolonged for many days producing a great increment, which remains after the iron is cooled again. This is allowed for in the calculation of the losses in transformers, since these will be smaller at first and gradually increase as the transformer is used. Heating to a red heat completely removes this new condition.

Magnetic Induction. - It has been explained that when a bar



hysteresis is eliminated. This proves that the control of the magnets is due to the magnets thomselves, and not to friction or other mechanical cause.

Origin of Magnetism.—It was suggested by Ampère that the magnetism in an atom of iron could be explained by assuming

of iron is magnetized by a coil the magnetic effects of both are added. It is usually more convenient to consider both effects together, and to reckon the total number of lines of force produced. A magnetic field of strength H produces H lines of force per sq. cm. in air, and it

will produce an intensity of magnetization I in the iron. Therefore 4#I lines of force per sq. cm. will be due to the iron, and the total number will be $4\pi i + H$ per sq. cm. This is called the magnetic induction, and is represented by B. If B is the total result produced by the force H, the ratio of B/H is called the permeability' of the iron, and is represented by μ . The ratio of I to H is called the 'susceptibility,' and is denoted by k. Hence, since I = kH, then $\mu = 1 + 4\pi k$. The permeability of air and nonmagnetic substances is taken as unity, or the unit magnetic induction is taken as that produced by unit magnetic force in air. In iron the permeability depends on the quality of the iron, and it is also by no means constant for any one sample. For small and moderate values of B the per-

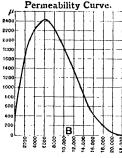


Fig. 10.

meability is high, and as the iron approaches saturation the ratio becomes less and less. In Fig. 5 was shown the relation of B to H, and Fig. 10 shows the relation of \(\mu \) to B for ordinary soft iron. The maximum value of μ may rise to 4,000 in the softest iron, showing what a vast difference is produced by the presence of iron. Alloys of iron or various kinds of steel are for the most part strongly magnetic, but less so than pure iron. Certain steels are even more magnetic than pure iron, while a manganese steel with 25 per cent. of manganese is almost non-magnetic. In all cases mechanical strain reduces the permeability and increases the hysteresis, well-annealed metal being the most permeable.

The Magnetic Circuit.—If a line of force is traced out completely, it will be found to return into itself, making a closed path, or into the opposite pole of a magnet, through which it may be considered to pass to the initial pole. This path is called the magnetic circuit.' If the lines of force pass round an iron ring

magnetized by a coil of wire, the circuit is very definite, as all of the lines of force are confined to the ring. But with a straight bar magnet or straight coil of wire the path through the air is very varied in length and direction, and the idea of a circuit is difficult to apply. In many magnetic appliances, however, the path is wholly or to a great extent through iron, and this content through iron, and the content through iron, an ception affords a very simple means of calculation. If the source of magnetism is a coil of source of magnetism is a coil or wire, as is usually the case, the total magnetizing influence is called the 'magneto-motive force;' and this equals the magnetic force through each part of the circuit, multiplied by the length of the path. It may be shown that this product = $4\pi nc$, where n is the total number of windings in the coil, and c is the current in C.G.S. units. If the current is expressed in ampères, the expression becomes $\frac{4\pi}{10}nc$, or

Magnetic Flux. — The total number of lines of force passing through a coil and round the magnetic circuit is called the 'magnetic flux.' This is dependent on the magneto-motive force (M.M.F.), and on the nature of the circuit. The ratio of M.M.F. to magnetic flux is called the 'reluctance of the circuit.' It is

length equal to area × permeability; or, with a circuit of varied area and permeability, the reluctance $=\frac{l_1}{A_1\mu_1}+\frac{l_2}{A_2\mu_2}+\frac{l_3}{A_3\mu_3}+$ etc., where l_1 , l_2 , l_3 are portions of the circuit through which the area and permeability remain unchanged. Thus, in a simple circuit of a uniform iron ring, the flux is easily calculated if the quality of iron is known; but it must be remembered that the value of # varies with the induction, or the number of lines of force per unit area. It is more usual to decide on a definite value for the induction and total flux, and from this to calculate the M.M.F. re-quired to produce it. If the circuit contains a narrow air gap, a second term must be used; and as the permeability of the iron may be over 1,000, and that of the air is 1, it is obvious that even a narrow air gap greatly increases the reluctance of the circuit. The calculation is complicated by the fact that the path from one side of the gap to the other is not a straight one. The lines of force spring out-wards or repel one another, thus increasing the area and decreas-

ing the reluctance; and this decrease is difficult to calculate.

In the calculation of dynamos, only those lines of force are useful which pass through the core of the armature, and those which escape the core are called 'leakage lines.' It is therefore convenient to express the ratio of total lines (which all pass through the iron) to the useful lines as a leakage coefficient, which may vary from 11 up to 14 in usual designs. Then the equation be-

comes
$$\frac{4\pi nC}{10} = \frac{N_1 l_1}{A_1 \mu_1} + \frac{N_2 l_2}{A_2 \mu_2} + \text{ etc.},$$

where N₁, N₂ are the number of lines through the areas A₁, A₂, and A₂ will represent the area of the air gap between the pole face and the core, while the leakage lines are ignored in this part of the expression. The leakage coefficient may be calculated, but is usually well known for any particular design of dynamo.

It is clear that this expression is similar to that used for an electric circuit—viz. E.M.F. = C × R. Current corresponds to magnetic flux, and resistance to reluctance. The calculation in electric circuits is, however, con siderably simpler, because the conductivity of the material is constant, whereas the permea bility of the iron is variable, and ralso because in the electric circuits.

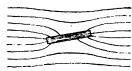


Fig. 11.

cuit the path is almost always strictly enclosed in insulating materials, whereas there is no magnetic insulator, and the lines of force are free to spread. That they confine themselves with some completeness to a path through iron is only due to the high permeability of the iron as compared with air; and any constriction of the iron path at once causes emergence of some of the lines seeking an alternative path. When the problem is more general —as, for example, a piece of iron placed in any position in a magnetic field—the calculation of the effect is much more complex. The iron acts as if it draws the lines of force to itself; for, as it offers an easier path than the air, the lines will bend round so as to enter and lie in the iron. Thus enter and lie in the iron. it distorts the magnetic field, the distortion being greater when the length of iron in the direction of the lines of force is considerable, for it offers an important reduction of reluctance. A short piece of iron, especially a sheet placed perpendicularly to the direction, exerts little influence. Fig. 11

shows the effect of a bar of iron in an otherwise uniform field. It will be seen that near the ends the field is strengthened, while at the sides it is reduced. Hence, where observations of the earth's magnetic force are to be made, it is very important that no iron pipes or girders are near.

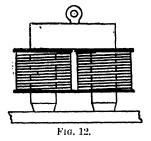
Magnetic Screening .- Although no material is non-permeable, and hence no space can be completely protected from magnetism, nevertheless, by surrounding a space by a thick iron shell the lines of force of (say) the earth are induced to pass round the space through the walls of the shell, and the inside is almost completely screened. A second box inside the first gives an improved effect. The method is used to protect delicate galvanometers from the disturbing influence of external magnetic effects. Since the action is due to the lower reluctance of the iron, it is important to use the softest iron, and to make the walls of considerable thickness.

Tractive Force.—Since the opposite poles of two magnets attract each other, there will be a similar attraction between the cores of two electro-magnets, or between the two parts of the core of a single electro-magnet. This is used in electro-magnetic appliances for producing mechanical movement, which can be controlled by the electric current in the coil, and can thus be operated at a distance. Electric bells and indicators, telegraph sounders, and many other contrivances are Since the lines of examples. force pass from one piece of iron to the next, one end will be a north pole and the other a south pole, and hence attraction will result. Another explanation is afforded by stating that the iron tends to move so as to shorten and improve the magnetic circuit -i.e. to reduce the reluctance. This is usually effected by reducing the air gap between the iron parts. The calculation of the force is rendered difficult by the leakage of the lines of force, which invariably occurs at an air gap. If the air gap is very short compared with its area, the tractive force is approximately equal

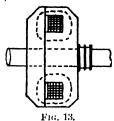
to $\frac{B^2A}{8\pi}$ dyncs, when B is the induction, and A is the area of surface in sq. cms. Or it may be written $\left(\frac{B}{5000}\right)^2$ A kilograms.

Thus, if the iron is strongly magnetized, so that B has the value 20,000, the pull will be 16 kilograms per sq. cm., or 2 cwt. per sq. in. It will be noticed that a high induction is more important than a large area, and therefore the poles of electro-magnets for lifting purposes are reduced

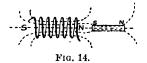
at the ends, in order to concentrate the magnetic effect. The appliance is used for lifting iron plates by employing an electromagnet at the end of the chain of the crane instead of a hook or claws. Fig. 12 shows a form of magnet for lifting purposes. Another application is seen in



the magnetic clutch, by which the two halves of a line of shafting may be connected, or a pulley on a shaft may be fixed to it or run free. Fig. 13 shows a simple form. A single circular coil is embedded in the face of one-half of the clutch, forming an electro-magnet of concentric form, and the other half acts as



a keeper or armature. Current is taken to and from the coil by brushes of wire sliding on brass rings insulated from the shaft. When current is 'on,' the two halves are drawn together, and the one drives the other by fricton. On stopping the current, the clutch is instantly released.



Coil and Plunger Mechanism.—If a bar or plunger of iron is brought near to a coil carrying a current, the bar is sucked into the coil, until it reaches the central symmetrical position. The action may be described in different ways. In Fig. 14 is shown the coil with iron core. Some of the lines of force pass into the near end of the core, and emerge

at the farther end, thus magnetizing it. The end near to the coil is in a strong field, and the attraction is great; while the more distant end is in a weak field, and the repulsion is therefore weak. Hence there is a pull into the coil, which continues until the pull on each end is equal, which will occur when the centre of the core is in the centre of the coil. This may be expressed by stating that soft iron moves to the strongest part of the field, which will be the centre of the coil. Or it may be said that the iron moves so as to improve the magnetic circuit, and to decrease the reluctance. As the part inside the coil is the more important on account of its small area through which all the lines of force must pass, these different statements have the same meaning. This action is useful when a longer movement is required than in the foregoing examples. For the keeper arrangement, while af-fording a powerful pull over a short distance, is ineffective if the keeper is at a distance. With the plunger, a long coil may be used, and the effective distance of action extends proportionally. The calculation of the pull is somewhat complex, and depends upon the shape and size of both coil and plunger. With both of the same length, the maximum pull is obtained when the plunger is about half-way into the coil.

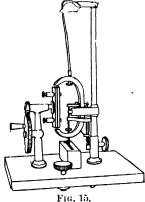
Electric Measuring Instruments.—The movement of small pieces of iron in one of the above described ways is much used in instruments for measuring electric current. A simple plunger may be used, hung on the end of a lever, and the movement of the other end of the lever is indicated on a scale. Or the plunger may be hung from a spring balance, and the extensions of the spring are a measure of the current. In others the iron is drawn away from the axis towards the side of the coil, when in short coils the field is strongest. In others the iron lies across the axis, and is turned parallel to it.

Various other forms are in use. Testing of Magnetic Properties of Iron.—The measurements required are the permeability and the hysteresis. The permeability is tested by measuring the induction produced by a measured magnetic force. The latter, depending on the current, the number of coils, and the length of the magnetic circuit, is easily calculated. The induction may be measured by wrapping a small 'search' coil round the sample of iron, the ends of the coil being connected to a ballistic galvanometer. A sudden increase in the current causes an increase in the number of lines of force which

pass through the coil, thus inducing an electro-motive force in the search coil, and a momentary current flows round the coil and galvanometer. The consequent swing of the galvanometer needle measures the increase in the magnetic induction in the iron, and by successive increments of current the iron is magnetized by measured amounts. The actual process and the calculations involved are too lengthy to be entered into here. Instead of a search coil and a ballistic galvanometer, the magnetic state of the iron may be measured by a magnetometer if the iron is in the form of a long straight wire, since its magnetic moment or the strength of the magnetic pole induced at the end is measured by the deflections of the small magnet. There are many special instruments for the purpose, among which may be mentioned Professor Ewing's permeability bridge, in which a bar under test is compared to a standard iron bar, and both are brought to the same magnetic condition by varying the currents in the respective coils in which they are placed. Thus the values of the magnetic force which each requires are found, and the permeability of the standard being known, that of the sample under test is readily calculated. Other forms depend on the tractive force. If two rods, placed end to end in a magnetizing coil, are pulled apart, the force required to separate them is proportional to B², as stated above. Hence, by measuring the current in the coil and the mechanical force, the values of B and \(\mu\) are ascertained. In all these tests it is essential that the length and area of the magnetic circuit should be known, and therefore the circuit is made entirely of the sample to be tested, or else parts of it are completed by very thick blocks of soft iron, the reluctance of which may be neglected. In the magnetometer method this is obviously impossible, since the return path is through the air. Hence it is essential that the iron rod should be very long and thin, in order that the return path may be of small influence.

Hysteresis Measurement, —In the ballistic or magnetometer methods, a complete cycle may be carried through, and by plotting and measuring the arca of the curve so obtained (Fig. 8), the hysteresis may be meas-Other curves are then obtained for different maximum values of B, and the hysteresis curve (Fig. 9) is thus determined. But the value of the hysteresis is usually required when the iron is to be subjected to an alternating field, and each alternation causes

a definite loss of energy. The loss may thus be directly measured if a coil of wire is wound round a simple magnetic circuit composed of the iron to be tested, and an alternating current is passed through the coil. The power absorbed is measured on a wattmeter, and from a knowledge of the speed of alternation and the volume of the iron, the loss per cycle per cubic centimetre is deter-mined. To reduce eddy currents in the iron, it must be in the form of thin plates, and the apparatus is built up by piling narrow strips on each other so as to make a hollow square of iron. In Ewing's hysteresis tester a small square rod is built up of narrow strips of iron, and is clamped crosswise on an axle turned by a handle. A



large horseshoe magnet is placed opposite to the axle, so that the sample revolves between its poles. When it is along the line of the poles it becomes magnet-ized, and as it passes away the residual magnetism in it attracts the magnet. The ordinary attraction of soft iron on a magnet is eliminated, since this will act in opposite directions as the sample approaches the poles and recedes from them; but the residual magnetism will always act in the same direction, and if the magnet is hung on bearings or knife edges, it will swing over in the direction of rotation of the sample. The extent of the deflection is a measure of the hysteresis in the specimen. Fig. 15 shows the A similar method apparatus. has been used for measuring the hysteresis in a rotating magnetic field, which represents the condition of a dynamo armature. The sample is cylindrical, and is placed between the poles of a magnet which is rotated. The pole pieces are cut to a cylindri-cal form, the axis of which is the axis of rotation, and the sample is also concentrically placed. The sample is held in pivots, and the hysteresis produced when the magnet revolves tends to turn the sample round with the magnet. Movement is checked by a spring attached to the sample. and the deflection measures the hysteresis in the iron.

Magnetism in other Materials. —It has recently been discovered that certain alloys of the nonmagnetic metals copper, manganese, and aluminium are almost as magnetic as cast iron, and show residual magnetism and change of permeability in the same manner. For all ordinary purposes, however, metals other than iron, nickel, cobalt, and magnetite may be considered non-magnetic. But careful examination shows that many substances are feebly magnetic. The salts of iron, nickel, and cobalt, and oxygen are the most conspicuous, oxygen in the liquid state being appreciably magnetic. On the other hand, certain substances, notably bismuth metal, are less affected than empty space. They are called 'diamag-netic bodies,' and their permea-bility is less than unity. Lines of force will tend to avoid passing through them, and they will be repelled out of a magnetic field. But the effect is very small. No residual effect has been discovered in diamagnetic bodies. See Du Bois's The Magnetic Circuit (trans. Atkinson, 1896) and Ewing's Magnetic Induction in Iron and other Metals (1904).

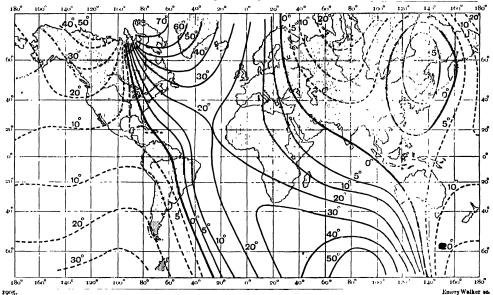
Magnetism, TERRESTRIAL. It was shown by Gilbert in the year 1600 that the facts then known about the magnetic condition of the earth's surface could be explained by assuming that the earth was a uniformly magnetized sphere, the magnetic poles of which approximated to the geographical poles. With small modifications, this theory has been accepted universally, but the cause of the magnetization is still completely obscure. It is well known that the compass needle points approximately north and south over the whole of the globe, except in the Arctic and the Antarctic regions. The variation from the true north--riz. the angle between the direction of the compass at a certain place and the line of longitude through that place—is called the 'declination' for that place. Again, if a compass needle is balanced on a horizontal axis through its centre of gravity, so that gravity has no tendency to set it in any position, it will lie at an angle to the horizontal, called the 'angle of dip' or 'in-clination,' which is approximately zero at the equator, and becomes greater as the latitude increases. In the northern hemisphere tho north-seeking end of the needle

points downwards, while in the southern hemisphere the reverse As the needle is is the case. under the control only of the magnetic field, it follows that the lines of magnetic force (see MAGNETISM) enter the surface of the earth at a gradually increasing steepness, until at or near the poles they are perpendicular to the surface. This is the distribution afforded by a uniformly magnetized sphere, and was the basis of Gilbert's theory. The strength of the magnetic field is approximately equal at points along a line of latitude, but changes from the equator to the poles. The total force is at a maximum at the poles, but the horizontal component-viz. that part

clearly due to magnetic rocks, and others are very possibly caused by these rocks at considerable depths. Since basaltic rocks are magnetic, it is not improbable that great masses of magnetic material exist of which there is no direct evidence. The declination, dip, and horizontal force vary slightly at any one place during the course of the day and night, the change being a gradual shift backwards and forwards about the average values. The variation is greatest in summer and least in winter. Thus it is obviously caused by the heat of the sun; but the manner of its influence is uncertain. There is There is a marked change which occurs over periods of eleven years, and

sun, or indirectly through changes in the upper atmosphere, is not known. They are of sufficient strength to interfere seriously with telegraphy, since the changes in the earth's magnetism induce currents of electricity in the telegraph wires. For navigation purposes the value of the declination at different parts of the surface of the earth is set out in charts, which, however, require correction from time to time. Charts for scientific purposes are also made, showing the dip and the value of the horizontal and vertical components. The form adopted is to draw lines round the earth through places at which the declination and diphave equal values, the former being called

Lines of Equal Magnetic Variation.



which affects the ordinary compass needle—is at a maximum at the equator.

Variations.—By supposing the axis of the magnet to emerge at a spot lat. 78° N. and long. 68° w. of Greenwich in the region of Baffin Bay in Canada, and at a corresponding spot near the south pole, and shifting all the magnetic lines uniformly, a fairly correct idea of the magnetic distribution is obtained (Fig. 1). If another and a weaker pole is assumed in N. Siberia, and a similar one near the south pole, a slight distortion of the distribution is caused, which gives a more accurate representation. In addition to this there are very many local variations, some of which are

corresponds to the occurrence of sun spots. There is also a secular or very slow change in the position of the magnetic axis of the earth. Thus in the year 1570 the declination at Greenwich was 11° east of north, in 1660 it was due north, in 1800 24° west of north, and is now decreasing, being 15° west of north. From time to time there occur sudden fluctuations, which may extend over several degrees, called magnetic storms. They seem to be connected frequently with brilliant displays of the aurora borealis, and are usual during disturbances in the sun, as shown by sun spots; but whether they are due to the direct magnetic influence of the

Variation West -

Variation East ----

'isogonals,' and the latter 'isoclinals.' The isogonals, at which the declination is zero, are called 'agonic' lines.

Mariner's Compass.—The mariner's compass is in essentials a small steel magnet pivoted or suspended at its centre, so as to be free to move in a horizontal plane. Obeying the magnetic laws (see MAGNETISM), it comes to rest along the line of magnetic force which passes through its centre. Therefore it does not, in most cases, indicate the true north, and the correction for declination must be applied. Lord Kolvin's compass is a great improvement on the single magnet form, in that several long thin needles are employed, fixed on

a light framework. The thin needle is capable of greater magnetization than thick ones, and by spacing them widely the demagnetizing action of each on the others is much diminished. The outer needles are shorter than those at the centre, thus allowing a very perfect distribution of magnetism, in addition to utilizing a large part of the circular space. The magnet system is often floated in a liquid, to check oscillations; and the case is hung on gimbals, to allow for the movement of the vessel. See W. Watson's Text-book of Physics (1900).

Magnetite, or magnetic iron ore, Fe₃O₄, is an important ore

mon Prayer it occupies the position of the first canticle in the office of Evensong.

Magnificent, a British first-class battleship (14,900 tons) launched in 1894. The name was introduced into the navy in 1766. Magnifying Glass. See

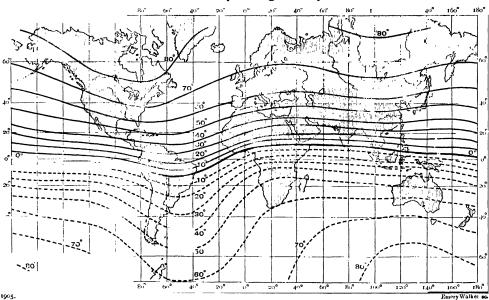
LENSES. Magnitude, a conventional

measure for apparent stellar brightness. Hipparchus and Ptolemy divided the stars into six classes or magnitudes. The system, later extended to telescopic stars, was rendered precise by the adoption of Pogson's light-ratio (1850). On this scale, the brightness of stars of adjacent magnitudes is in the proportion 2.512

and conspicuous, solitary flowers, usually of great beauty, and often very tragrant. They are readily grown in moderately rich soil, and are not difficult to propagate by means of seeds or layers. Many of the species do well in the open in the milder parts of Britain, but all profit by a little shelter, such as the protection of a wall. The hardiest of all the magnolias is M. acuminata, the cucumber tree, a deciduous species from N. America, growing to about fifty feet in height, bearing in carly summer large yellowish-green flowers, followed by cucumber-like fruit.

Magnus, kings of Norway, chief among whom were: - MAGNUS, the

Lines of Equal Magnetic Dip.



Above the Magnetic Equator the North Pole dips -Below the Magnetic Equator the South Pole dips -----

of iron that is worked to a very large extent in Scandinavia (c.y. Dannemora). It is found as a heavy (sp. gr. 5.2), brittle black solid, with a metallic lustre (h. = 6). It has magnetic properties, though not many specimens exhibit definite poles.

Magneto - electricity. ELECTRICITY, CURRENT. See Magneto Ignition. Sec

MOTOR CARS AND CYCLES. Magnetometer. See MAG-NETISM.

Magnificat, the hymn of the Virgin Mary. Its use in the services of the church dates back to at least the commencement of the 6th century. There are Eng-lish versions of it from the 14th century. In the Book of Com-

to 1, the light-ratio being further defined as the number of which the logarithm is 0.4. Gradations of brilliancy, discriminated by modern astronomers to one-tenth of a magnitude, are expressed by decimals; fractional and negative numbers indicate degrees of brightness exceeding first magnitude. Thus, a star of zero magnitude gives 2 512 times the light of one of standard first magnitude, and the negative magnitude of Sirius (-1'6) signifies its being 1'6 times brighter still. The sun's stellar magnitude is approxi-mately -26.5.

Magnolia, a genus of hardy or tropical shrubs or trees belonging to the order Magnoliaceæ. They have large, entire leaves

Barefooted' (1073-1103), reigned from 1093; incorporated the Hebrides and Orkneys, together with the Isle of Man, in 1102. He made a descent upon Ireland, but was slain in battle, and buried at the cathedral of Down.—Mag-Nus, 'the Lawgiver' (1238-80), crowned at Bergen in 1261. Besides the Norwegian codes, he compiled the code called Jarnsida for Iceland (1271-2). Under him the crown was declared to be hereditary and the realm in-divisible. He restored the Hebrides to Scotland in return for an annual tribute. He was a friend to the clergy, and granted to the Hanseatic League privileges injurious to the commerce of his country.

Magnus, or Magni, Olaus (1490-1558), Swedish historian, born at Linköping; was made archbishop of Upsala. He was author of Historia de Gentibus Septentrionalibus (1555).

Magnus, SIR PHILIP (1842), English educationist, born in London; director and secretary of City and Guilds of London Institute (1880-8), and now secretary of department of technology there; is a voluminous writer on general scientific and technical subjects, particularly on industrial problems in relation to technical training.

Magnusson, ARNI, or ARNE (1663-1730), Icelandic historian and archæologist, born in W. Iceland; became professor of history and Danish antiquity in the University of Copenhagen. Author of Incerti auctoris Chronica Danorum et præcipue Islandiæ (1695) and Testamentum Magni-Regis Norvegia (1719). He left to the University of Copenhagen a most valuable collection of Icelandic Mss., known as the Magnæan Institute.

Magnusson, or Magnussen, Finnur (1781-1847), Icelandic archæologist, born at Skalholt, Iceland; became professor at the University of Copenhagen (1815), and was university archivist at the time of his death. He translated and annotated the Sæmundar Edda (4 vols. 1821-3); edited, with Rafn, Grönlands Historiske Mindesmærker (3 vols. 1838 42); and wrote Eddalæren og dens Oprindelse (4 vols. 1824-6), and Prisce Veterum Borealium Mythologiæ Lexicon (1828).

Mago, Carthaginian soldier. Barca, and brother of Hamilcar At the battle of the Trebia, in 218, he commanded the ambushed troops whose attack decided the victory, and at Cannæ he shared with Hannibal the command of the main Carthaginian force. Then for several years he carried on a war against the Romans in Spain, along with his brother Hasdrubal and Hasdrubal's son Gisco. His decisive defeat oc-Gisco. His decisive defeat oc-curred in 206 B.C. In the next year he invaded North Italy; but the Roman invasion of Africa caused the Carthaginians to recall him, and he died on the way home.

Magog. See Gog And Magog. Magpic (Pica rustica), a member of the crow family (Corvidæ). Its unpopularity with game-pre-servers is due to its fondness for the eggs and young of the larger birds; but it benefits the farmer by attacking mice, rats, voles, as well as snails, slugs, and so on. In the male the black feathers are beautifully glossed with green and violet. In a fullgrown male, measuring about

eighteen inches in total length. the long tail feathers may be eleven inches long. The nest is made of thorny sticks, mingled with roots and turf, and lined with clay. The eggs are from six to nine in number. The magpie is widely distributed over Europe and Asia, and also occurs in N. America.

109



Magpie.

Maguey. See AGAVE. Magus Muir, reclaimed tract of land 31 m. w.s.w. of St. Andrews, Fifeshire, Scotland; the scene of Archbishop Sharp's murder by Cameronian Presby-

terians on May 3, 1679.

Magyars (properly Hunagars, Hungarian), a Finno-Ugrian or Finno-Turki people, who about 550 A.D. moved from the Ural region to the Volga, and after a long sojourn on the Russian steppe were driven w. by the kindred Khazars. Under their king, Arpad, the united Hunagar-Magyar nation obtained a permanent footing in Pannonia before the close of the 9th century. The bulk of the population have regular features, shapely figures, black hair and eyes, dark complexion, medium stature, quick, impulsive temperament, and intense patriotic feeling. The Magyar language is steadily encroaching on all the surrounding German, Slav, and Roumanian languages, the people of Magyar Ranguages, the people of Magyar speech having increased from 8,436,000 in 1890 to 9,954,000 in 1900. See Vambéry, 'On the Origin of the Magyars,' in Mitt. d. K. K. Geograph. Ges. (1897).

Mahabaleshwar, a ridge of the W. Ghats, about 70 m. s.e. of Bombay, having an average altitude of 4,500 ft.; is the hot-weather resort of the governor of The sanatorium was Bombay. established in 1828. The village is of great sanctity in the eyes of Hindus, as the spot where the sacred Krishna has its source. Its average rainfall is 240 inches.

Mahabalipur, vil., Chengalpat dist., Madras, India, 35 m. s. of Madras; has famous cave temples and rock sculptures.

Mahábhárata, a sacred book of the Hindus, and probably the longest epic of the world; marks the period when Brahmanism, compelled to abandon its attitude of haughty isolation and to recognize the existence of thoughts and aspirations other than its

own, held out its hands to folklore, demonology, and hero-wor-ship. Its authorship is ascribed to supernatural agency; but its redaction remains loose, fragmentary, and chaotic, and its story is smothered under didactic pronouncements, irrelevant di-gressions, vivid descriptions of scenery, relieved here and there by flashes of lofty moral sentiment. Two brothers of the Lunar dynasty establish rival thrones in Bharata (N. India). Dhritarashtra, the elder, has one hundred sons, commonly known as the Kurus, who represent the powers of evil. The powers of good are represented by Pandu, the younger brother's five sons, who have a common wife, Drau-padi, the Helen of the song. When the l'andu princes, in con-flict with their foes, have lest all, they stake Draupadi, and, on the throw of the dice, she becomes the prize of their rivals. The god Krishna comes to the assistance of the outraged wife, and as her single garment is repeatedly torn from her body by the exultant Kurus, Krishna clothes her with innumerable celestial robes. The wanderings and trials of the Pandus signify the temporary triumph of vice, until the victory of virtue is crowned by the renunciation by the Pandus of an earthly throne for a heavenly kingdom. A new edition, comprising Sanskrit text, with complete English and Hindi translations, was begun at Moradabad in 1902. There is an English prose translation by Protap Chandra Roy (1883, etc.). See Jacobi's Mahabharata (1903).

Mahadev Govind Ranade (1842-1901), Hindu lawyer and social reformer, born at Niphad in Bombay. In 1866 he became a translator in the government service, subsequently (1868) prime minister of Kolhapur state, and from 1871 held various high judicial offices. He was prominent in the agitation for allowing Hindu widows to remarry, and in educa-

tional movements.

Mahadeva. See Siva.
Mahaffy, John Pentland Mahaffy, JOHN PENTLAND (1839), Irish historian, and for many years professor of ancient history at Dublin University, born near Vevey, Switzerland. He has published Twelve Lectures on Primitive Civilization (1868); Greek Social Life from Homer to Menander (1874); Greek Anto Menanter (10/4); Greek Life and tiquities (1876); Greek Life and Thought from Alexander to the Roman Conquest (1887); Empire of the Ptolemies (1896); The Art of Conversation (1889); An Epoch in Irish History (1904); Progress of Hellenism in Alexander's Empire (1905). He edited an English edition of Duruy's Roman History (1883-6).

Mahan, CAPT. ALFRED THAYER (1840), American naval writer, was born at West Point. His writings on naval history, traditions, and power have won him world-wide recognition as a master-mind on maritime questions. His principal work is The Influence of Sea-Power upon History, 1660-1783 (1890), Subsequent works have been The Life of Nelson (1897), Lessons on the War with Spain (1899), Short History of the South African War (1900), The Problem of Asia (1900), Retrospect and Prospect (1902), and Sea Power in its Relation to the War of 1812 (1905).

Mahanadi, or Mahanudhy, riv., India, rises 25 m. s. of Raipur, in Central Provinces, and after a course of 520 m. falls into the Bay of Bengal by several mouths, about 120 m. s.w. of the Ganges delta. Area of catchment basin, 52,500 sq. m.

Mahanaim (Gen. 32:2, etc.), tn. in Gilead, Palestinc, stood apparently towards the s. (1 Kings 4:14). Jacob, having travelled along the plateau from Mizpeh, in N. Gilead, to Mahanaim, recrossed the Jabbok, retreating north before Esau, and descending to Succoth in the Jordan valley. N. of the river.

treating north before Esau, and descending to Succoth in the Jordan valley, N. of the river.

Mahanoy City, bor., Schuyl-kill co., Pennsylvania, U.S.A.; is in the anthracite coal region, 90 m. N.W. of Philadelphia. Pop. (1900) 13,504.

Maharajah. See RAJA.

Maharajnagar, tn. in native state of Charakhari, Bundelkhand, Central India. Pop. (1901) 11,718.

Mahavansa, two books written in Pali, which purport to give a historical account of the island of Ceylon previous to the 4th century. Portions were translated by George Turnour in 1837.

Mahavira, the last of the twenty-four Arkat (Jain teachers) of the present age. Originally a deity, Mahavira is said to have voluntarily submitted to successive incarnations, in all of which he succeeded in winning immortality. His holy life enabled him to work miracles.

Mahdi, the expected Messiah of the Mohammedans. A Persian Shia named Abdulla, who lived about the 10th century, and whose preaching was greatly influenced by the doctrines of Zoroaster, was the first to proclaim the advent of a future Moslem teacher greater than Mohammed, who would lead the faithful to victory and conquer the world. This Messiah, it was declared, would never die; and though for a time he might disappear, at his second coming he would reconcile all differences among true believers. This dogma

of Mahdism was accepted by the sect, then called Ismailis, to which Abdulla belonged. From time to time Mohammedan fanatics have risen in Syria, Persia, Turkey, and Egypt, who, claiming to be the Mahdi, have attempted the prosecution of religious wars. The most modern of these Mahdis was Mohammed Ahmed (born at Dongola in 1843; died at Omdurman in 1885), who made repeated efforts to conquer the Sudan. See James Darmestetr's The Mahdi, Pust and Present (1885); Wingate's Muhdism and the Egyptian Sudan (1891); and Dujarric's L'Elut Mahdiste du Soudan (1904).

Mahé, French settlement, Malabar dist., Madras, India, 33 m. N.w. of Calicut. Settled in 1722, it was taken by the British in 1761, and again in 1779, being restored to France in 1815. Area, 2 sq. m. Pop. (1902) 9,455.

Mahikantha, group of feudatory states under the political control of the government of Bombay, India. Area, 11,049 sq. m. Pop. (1901) 361,545.

Mahim, suburb of Bombay,

Mahim, suburb of Bombay, India, on N.W. coast of Bombay I. Oysters are abundant. Pop.

(1901) 5,699.

Mahmud I. (1696-1754) became Sultan of Turkey in 1730, and was involved during the whole of his reign in wars with Austria and Russia, who had conspired to partition his kingdom. He inflicted several defeats on the Austrians, and recovered Belgrade, but did not make much headway against the Russians.—MAHMUD II. (1785-1839) became Sultan in 1808. In 1826 he suppressed the famous Janissary troops, and reorganized the army on European lines. Nevertheless he was forced in 1829 to recognize the independence of Greece, but successfully repressed (1833) the revolt of Mehemet Ali in Egypt. He also made a strenuous attempt to reform the internal administration and finances of the emission.

Mahmud of Ghazni. See

Mahogany, the wood of a West Indian and South American tree, Swittenia mahagoni, belonging to the order Cedrelacee. It was first brought to Britain a little over two centuries ago by Gibbons. When felled, mahogany is of a light reddish-brown colour, but it soon darkens on exposure to sunlight. The heartwood is heavy, hard, close and straight in grain, and takes a very high polish, with a characteristic lustre, and sometimes with a wavy figure. Cuba or Spanish mahogany is used as a substitute for oak in shipbuilding, for beams, planks, and stanchions, whilst figured logs demand high prices for furniture.

St. Domingo mahogany is very similar in quality, very hard, almost horny, a stress of 4,300 lbs. per sq. in. being required to indust it in the stress of th dent it in in transversely to the fibres. It is mostly figured, presenting a rich curl or feather at the bases of its branches. It is entirely used for cabinet work, especially for veneers. Nassau mahogany is used in turnery. Honduras mahogany is seldom figured, becomes somewhat brittle on drying, and is apt to develop deep star-shakes. Stress required to indent it 20 in. transversely to its fibres, 1,300 lbs. It is known commercially as 'baywood,' and commercially as 'baywood,' and besides being used as a substitute for oak in shipbuilding, is largely used in cabin fittings and by cabinetmakers, turners, and carpenters. Some mahogany sold as Honduras is really Guatemalan. Mexican mahogany reaches the largest dimensions, generally coming to market in logs from 18 to 30 ft. long, and from 15 to 36 in. square. It is generally somewhat soft and spongy at the centre, often affected by star-shake, and plain in figure. The wood of the Coromandel redwood, Soymida febrifuga, is sometimes called East Indian mahogany; that of Eucalyptus botryoides, bastard mahogany; of Khaya senegalensis, African mahogany; of Eucalyptus resinifera, forest or red mahogany; and Cercocarpus ledifolius, bay mahogany.

Mahomet, Mahomedanism. See MOHAMMED, MOHAMMEDAN-

Mahon Port. See PORT

MAHON. Mahony, Francis Sylvester (1804-66), Irish humorist, known as Father Prout, was born at Cork. Settling in London as a man of letters, in 1834-6 he contributed to Fraser's Magazine his Reliques of Father Prout. As an original lyrist Mahony is on his highest level with the haunting if somewhat artificial Bells of Shandon. His most elaborate prose - the Apology for Lent, Dean Swift's Madness, Literature of the Jesuits — is brilliantly allusive and energetic in style, but suffers from temperamental extravagance of humour and argumenta-tive whim. In 1837-42 further papers of the Prout type were written for Bentley's Miscellany. After 1858 he was Paris correspondent for the Globe. In 1860 he wrote a characteristic inaugural ode for the first number of Cornhill. The Reliques of Father Prout appeared in 2 vols. in 1836, and again in 1860. In 1881 Charles Kent edited his Works. with memoir.

Mahrattas. See Maratha. Mährisch-Ostrau. See Ostrau-Mährisch.

Mahurea, a genus of South American evergreen trees belong-ing to the order Ternstræmiaceæ, bearing terminal panicles of pinkish or purplish flowers. M. palustris, which flowers in May, is the only species cultivated. It requires a peaty soil and stove heat.

Mahuwa, tn. and port, Bhaunaghar state, Kathiawar peninsula, Bombay, India, 55 m. N.E. of Diu. Pop. (1901) 17,549.

Mai, ANGELO (1782-1854), Ital-

ian classical scholar, born at Schilpario (Bergamo). Appointed (1813) keeper of the Ambrosian library at Milan, he was successful in bringing to light lost writings of Cicero, Cornelius Fronto, and Plautus. In 1819 he was appointed librarian of the Vatican. in 1833 secretary of the Propaganda, and received the cardinal's hat in 1838. See Life, in Italian, by Prina (1882).

Maia, in ancient Greek mythology, the eldest of the Pleiads, and by Zeus the mother of

Hermes.

Maiden, a species of guillotine constructed at Edinburgh in 1564-65, and used from that date onward till 1710.

Maidenhair Fern. See ADI-ANTUM.

Maidenhair Tree. Seo GINGKO.

Maidenhead, munic. bor. and mrkt. tn., Berkshire, England, on the Thames, 13 m. E. of Reading. A bridge (1772) crosses the Thames to Taplow. Remains of a Roman villa have been excavated. Pop.

(1901) 12,980.

Maidment, JAMES (1795-1879), Scottish antiquary, born in Lon-He edited numerous historical documents, mainly relating to Scottish affairs. He was chief editor of Kay's Edinburgh Portraits (2 vols. 1837), and collaborated with W. H. Logan in Dramatists of the Restoration (14 vols. 1877), The Spottiswoode Miscellany (2 vols. 1844-5), and Scottish Ballads and Songs (1859). See Bibliography, by T. G. Stevenson (1883)

Maids of Honour are attached to the Queen's household in the department of the mistress of the robes. To them is assigned the duty, in turn, of daily attendance upon the Queen. They rank, in precedence, after the daughters of barons, and before the wives of Knights of the Garter. They are entitled to the prefix 'Honourable.

Maidstone, munic. and parl. bor., Kent, England, 34 m. by rail E.S.E. of London, and on the The church of All Saints dates from the 14th century, and was attached to the college of All Saints, founded by Archbishop Courtenay. An archiepiscopal palace was also erected by Courtenay; the present building, chiefly Elizabethan, was acquired by the town council in 1887. The The grammar school was founded in 1547. The Charles Museum was opened in 1858, in the Chillington manor house. The county lunatic asylum is on Barming Heath. Industries include paper mills, breweries, malt kilns, and agricultural implement works. Stone is quarried, and hops and fruit are grown. The town was taken by Fairfax in 1648. It returns one member to the House of Commons. Pop. (1901) 33,516.

Maikop, fort. tn., N. Caucasia, Russia, 60 m. s.e. of Ekaterino-dar. Pop. (1897) 34,191.

dar. Pop. (1897) 34,191.

Malidun, a romantic character in ancient Irish lore, who, born in Co. Clare, and of the kindred of Owenaght, saw many wonderful things and performed many wonderful feats whilst tracking the murderer of his father. His exploits are detailed by Love in Accient Callie Re. by Joyce in Ancient Celtic Romances (1879).

Maimachin, Mongolian tn. and Chinese frontier post, opposite Kiakhta, in 50° 15′ N. lat. The town has two fine temples. It. trades in tea, silk, porcelain, paper, furs, and metal articles. There are hardly any permanent inhabitants, and women are forbidden to enter the town.

Maimansingh, dist., Dacca div., Eastern Bengal and Assam,

India. Area, 6,287 sq. m. Pop. (1901) 3,915,068. Cap. Nasirabad. Maimbourg, Louis (1610-86), French priest, born at Nancy; author of Traité historique des Prérogatives de l'Eglise de Rome (1685; Eng. ed. 1685), Histoire de la Décadence de l'Empire anrès Charlemagne (1681), and Histoire des Croisades (1682). He was expelled from the Jesuit order because of his Gallican views. His Eurres were published in 14 vols. (1686-7).

Maimon, Solomon (1754-1800), Jewish philosopher, was born near Mir in Lithuania; went to Berlin, and became a friend of Mendelssohn; was admired by Kant, and attracted the notice of Goethe. In his Versuch über Transcendentalphilosophie (1790) he endeavoured to improve upon Kant; he also wrote Versuch einer neuen Logik (1794). See his very interesting Autobi-

ography (Eng. trans. 1888).

Maimonides, Moses ben
Maimon (1135-1204), Jewish philosopher and physician, styled by the Jews Rambam, was born at Cordova in Spain, where he was forced to embrace Islam. In Cairo he became physician to the sultan of Egypt. He was a pupil and friend of Averroes, and wrote in Hebrew and Arabic, winning fame as a theologian, and was learned also in mathematics and astronomy. His chief works are Mishneh Torah, a systematic codification of Jewish Biblical law; Mishnah, a com-mentary; An Abridgment of the 16th Book of Galen; and (best known) Moreh Nebokhim (Eng. trans. as Guide of the Perplexed, by M. Friedländer, 1886), a philosophic explanation of difficult passages of Scripture. See Yellin and Abrahams's Maimonides (Jewish Worthies Series, 1903).

Main, riv., formed in N.E. Bavaria, Germany, by the junction near Kulmbach of the White Main and the Red Main. After a very tortuous course of 307 m., mainly westerly, past Bamberg, Schweinfurt, Würzburg, Hanau, Offenbach, and Frankfort, it joins the Rhine on the r. bk. opposite Mainz. It is navigable as far as Bamberg, but is canalized between Mainz and Frank-fort for the passage of larger vessels. Ludwig's Canal connects the Main with the Danube. The chief tributaries are the Regnitz and Tauber on the l. bk., and the Franconian Saale on the r. bk.

Maine. (1.) The north-easternmost state of the U.S.A., has an area of 29,900 sq. m. Originally a part of Massachusetts, it was admitted to the union as a state in 1820. The coast is extremely broken and rocky, with many headlands and deep bays, and thousands of islands. The surface is hilly, rising in Mt. Katahdin to 5,385 ft. Lakes and ponds are numerous—a result of erosion by the Laurentian glacier. Settle-ment is confined mainly to the s.w., the N. two-thirds being forest. The industries are slowly undergoing a change from agriculture to manufactures. Fine granite is quarried. The principal articles of manufacture are cotton cloth, woollen goods, and wood pulp. Lumbering and ice-cutting are active industries. Fishing thrives, especially for mackerel, cod, and herrings. The principal scaport is Portland; the capital is Augusta. The populacapital is Augusta. The population in 1900 was 694,466. (2.) Ancient prov. of France, lay 8. of Normandy and E. of Brittany, and corresponded roughly with departments Mayenne and Sarthe. The capital was Le Mans.

Maine, SIR HENRY JAMES SUMNER (1822-88), Scottish jurist and administrator, was born at Kelso. In 1847 he was appointed regius professor of civil law at Cambridge; but he soon migrated to London, and in 1852 was appointed reader in Roman law and jurisprudence in the Inns of Court. His great work on Ancient Law appeared in 1861 (ed. by Sir F. Pollock, 1906). He was legal member of the Council of India (1862-9). After his return he was appointed corpus professor of jurisprudence at Oxford, and wrote Village Communities in the East and West (1871; new ed. 1890), The Early History of Institutions (1875; new ed. 1890), and Early Law and Custom (1883; new ed. 1890). In 1871 he became a member of the Council of the Sceretary of State for India, in 1877 he was elected to the headship of Trinity Hall,

other Discourses (1890), by Sir F. Pollock.

Maine-et-Loire, N.W. dep. of France, formed from ancient Anjou. It is 2,812 sq. m. in area, consists mainly of low hills and plains, and is traversed from E. to W. by the navigable Loire, which is joined on the r. bk. by the Maine. The soil is generally fertile, especially in the Loire val-

ponnesus in Greece, now called Mani or Maina. They claim to be direct descendants of the ancient Spartans. They number over 40,000.

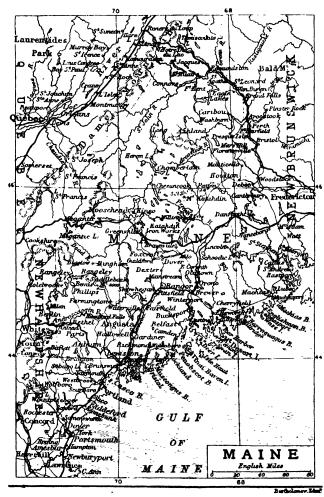
Mainpurl, cap., dist. of same name, United Provinces, India, 83 m. s.w. of Bareilly. Pop. (1901) 19,000.

Maintenance is the offence of maintaining a party in litigation in which the offender is not personally interested. It generally consists in providing money. A contract for maintenance is void, and the offence is punishable by fine and imprisonment, and is a cause of action for damages. The best-known modern case is Bradlaugh v. Newdigate (L.R., 11 Q.B.D. 1). See also CHAMPERTY.

Maintenance, CAP OF, in heraldry, a symbol of dignity at first confined to the arms of princes and dukes, but at a comparatively early period used by other branches of the nobility. In the achievement it is usually placed to support the crest. The cap is usually depicted as of blue or scarlet velvet turned up with ermine or some other fur, with the two points of the cap turned to the sinister.

Maintenon, Françoise D'AUBIGNÉ, MADAME DE (1635-1719), second wife of Louis XIV. Saved from scandal by her marriage with Scarron, poet and wit (1652), she met as his wife all literary Paris. After his death (1660) she was installed by Mme. de Montespan as governess of her children by Louis XIV. Having won the affection both of the children and their father, she was made Marquise de Maintenon (1673), and after the death of the queen (1683) was married secretly to Louis, probably in December 1684. Her influence coincides with the unfortunate half of Louis's reign (1685-1715), when persecution was rife. She found her greatest pleasure in the school of St. Cyr, which she founded for three hundred poor girls. Her Lettres, ed. Lavallee (12 vols. 1854), are accounted amongst the best French prose works of the 17th century. See Sourenirs sur Mme. de Maintenon, ed. Comte d'Haussonville and G. Hanotaux (3 vols, 1902-4).

Mainz (Fr. Mayence), fort. tn., grand-duchy of Hesse, Germany, on l. bk. of Rhine, opposite the mouth of the river Main. It is one of the most important commercial centres on the Rhine, and carries on a brisk shipping trade with Holland and Belgium. Its principal exports are leather goods, furniture, and wine, while lithographic and other printing are flourishing industries. Gutenberg, the inventor of movable type for printing, was born here.



Cambridge, and in 1887 to the Whewell processorship of international law. His International Law was not published until after his death. His political book, Popular Government (1885), is not in his happiest vein. See Sir Henry Maine (1892), hy Grant Duff; Theories and Criticisms of Sir Henry Maine, by M. O. Evans (1896); and Oxford Lectures and

ley. Flax, hemp, and the vine are cultivated (the last especially round Saumur). Coal is mined in the Loire valley, and slate is quarried round Angers. Cotton, woollen, and linen goods are manufactured. Cap. Angers. Pop. (1901) 514.658.

Pop. (1901) 514,658.

Mainland. See POMONA.

Mainotes, the inhabitants of the central districts of the Pelo-

The picturesque cathedral dates back to 978. The old castle of the electors, built in 1627-78, contains rich collections of Roman and Germanic antiquities, and the Gutenberg museum (1901). Mainz was founded by Drusus, 13 B.C., as Maguntiacum. The town's importance dates from 747, when it was made an archbishopric. Mainz was ceded to France in 1801 by the peace of Lunéville, but was retaken in 1814 and incorporated with the grand-duchy of Hesse in 1816. It is connected by a bridge with the fortified town of Kastel (the Castellum Mattiacorum of the Romans), on the r. bk. of the Rhine. Pop. (1900) 84,251.

Majorescu

Maiorescu, TITU (1840), Roumanian statesman and author, was born at Craiova, and became (1862) professor of philosophy, first at Jassy and afterwards at Bucharest. He has exercised an epoch-making influence on recent Roumanian literature, both personally and by his essays-Critice (2 vols. 1892). He is an eloquent speaker, and has several times (1874-6, 1888-9, etc.) been minister of public instruction, when he endeavoured to organize education in Roumania on the

Prussian plan.

Mairia, a genus of S. African herbaceous plants belonging to the order Composite, bearing rather large pink and yellow flower-heads. M. crenata, which flowers in the spring, is the only species cultivated. It requires a peaty soil, plenty of moisture,

and a greenhouse temperature. Maistre, Joseph Marie, Comte de (1754-1821), diplomatist and philosophical writer, born at Chambéry, Savoy. Fol-lowing the conquest of Savoy by the French, he quitted the country for Sardinia, and subse-quently went to Turin, and from thence to St. Petersburg as ambassador (1803). In 1817 he returned to Turin, and died there. De Maistre occupied a prominent position in his day as a philo-sophical writer. All his works are tinged with high political considerations, involving complete papal supremacy and the adoption of the principles and adoption of the principles and tenets of theoreacy. Author of Considérations sur la France (1796), Essai sur le Principe Générateur des Constitutions Politiques (1810), Du Pape (1819), Public (1917), aux (1901), aux De l'Eglise Gallicane (1821), and other treatises. Consult Critical Miscellanies (3 vols. 1886), by John Morley; and Lives, in French, by Lescure (1893), Grasset (1901), and Descostes (1904).

Maistre, XAVIER DE (1763-1852), soldier and littérateur, born at Chambéry, Savoy, brother of Joseph de Maistre. When the French subdued Savoy he went to St. Petersburg, and died in

that capital. His literary conceptions include Voyage autour de ma Chambre (1794), a work of striking originality, which had a sequel in the Expédition Nocturne autour de ma Chambre (1825), Lépreux de la Cité d'Aoste (1817), La Jeune Sibérienne (1815), and Les Prisonniers du Caucase (1815). An edition of his collected works was issued in 1881. See Life, in French, by Maistre and Perrin (1895), and in German, by Ungewitter (1892).

Maitland. (1.) EAST, town of N.S.W., Australia, 120 m. N. of Sydney, and on Hunter R. Vine and maize growing are carried on, and there are collieries. Pop. (1901) 3,287. (2.) M. WEST is much the larger place. Pop. 6,798.

Maitland, Scottish family of

Anglo-Norman origin, of whom the earliest known in Scotland was Thomas Matalant, who obtained lands in Berwickshire from William the Lion. The popular hero referred to in Gawain Douglas's Palice of Honour, and whose deeds were celebrated in popular song, has not been definitely identified. The ancient seat of the family was Thirlestane, Berwickshire, and in the 14th century they came into the possession of Lethington, East Lothian. --- SIR RICHARD MAITLAND, LORD LETHINGTON (1496-1586), was in November 1561 named an ordinary lord of session, and in December 1562 keeper of the great seal. The latter office he held until 1567, and the former until He made a famous collection of Scottish poetry, a com-plete edition of which is now in preparation by the Scottish Text Society. His own verses, chiefly satirical pieces, were printed by the Maitland Club in 1830. His History of the House of Scaton appeared in the same year.—His eldest son, WILLIAM MAITLAND (?1528-73), known as Secretary Lethington, entered the service of the queen-regent, who employed him on diplomatic missions. But joining the Lords in 1559, he had much to do with the supremacy of Protestantism in Scotland. When Mary Stuart in Scotland. When Mary Stuart returned to Scotland, Maitland was retained as one of her chief political advisers, holding the office of secretary. To reconcile Mary to Protestantism he did all that he could to bridle the pretensions of Knox. When Bothwell won the ascendency over Mary, Maitland again joined the Lords, who shortly afterwards sent Mary to Loch Leven. It is, therefore, difficult to believe that Maitland had any hand in the concoction-if they were concocted—of the casket letters that were used against Mary. On the failure of the Norfolk marriage scheme, which

he endeavoured to promote, he definitely separated himself from Mary's opponents. This led to his being formally accused of connection with the Darnley by Kirkaldy of Grange and lodged in the castle of Edin-burgh, he was by the nobles purged of privitic to the murder of the king or regent, and set at liberty. After a vain attempt to reconcile the two factions, he, on April 1, 1571, joined Kirkaldy of Grange, who was holding Edin-burgh Castle for the queen. On its capture he was sentenced to execution, but died while in prison in Leith.—His brother, SIR JOHN MAITLAND, LORD MAIT-LAND OF THIRLESTANE (?1545-93), became lord high chancellor of Scotland. In 1567 he was made lord privy seal, and in 1568 a spiritual lord of session. Being with his brother in Edinburgh Castle on its surrender, he was sent a prisoner to Tantallon, and did not obtain full liberty until Morton's resignation of the regency in 1578. He took an active part in Morton's final overthrow, and after Morton's execution in 1581 won the confidence of the king, and exercised a supreme influence in the king's counsels. In 1587 he was made lord high chancellor. Some of his Latin verses are included in Delicia Poetarum Scotorum (1637). His son John became first Earl of Lauderdale, and was father of John, second earl and first duke. (See LAUDER-DALE.) See Skelton's Maitland of Lethington (1887-8).

Maitland, Sir Frederick Lewis (1777-1839), British ad-mial, was born at Rankielour, Fifeshire; took part in Lord Howe's victory of the first of June 1794, and was employed in the Egyptian expedition of 1801. In 1815, when in command of the Bellerophon, he received the sur-render of Bonaparte. See his Surrender of Navoleon (1904).

Maiwand, place, 35 m. w. of Kandahar, Afghanistan, was the scene of the defeat of the British under Burrows by Ayub Khan on July 27, 1880.

Maize, or Indian Corn (Zea mays), is a true grass, and is only known in the cultivated state. It is indigenous in tropical America, and has been cultivated for ages in the E. Indies, whence it passed to China, India, and Turkey. Large supplies come to Britain from the Danubian provinces, but the principal supply is from N. America. It can be successfully grown in the south of England as a fodder crop, and is very suitable for ensilage. The plant grows to a height of 11 ft. It is moncecious, producing beautifully tasselled male flowers; and the female flowers, which develop the 'cobs,' are found closely applied to the central axils of the leaves below. The grain is somewhat deficient in albuminoids, but is rich in carbohydrates, such as starch and fats. The meal does not mix freely with water. It is not suitable for bread-making, but when deprived of its gluten is the basis of oswego or corn flour. The green cob is a delicacy, and the ripened grains of the harder varieties 'pop' or burst when roasted, and the inside swells up, and is of agreeable flavour.



1. Ripe head, or cob; 2. earlier stage, with 'silk'; 3, single female flower; 4, male flower; 5, part of male spike; 6, seed.

Maize Beer is used in many parts of S. America. The native women chew maize, and eject the mass into a large calabash. It is then diluted with water and allowed to ferment spontaneously. This beverage produces powerful effects on those who indulge in it.

Majestic, a British first-class battleship (14.900 tons), launched

in 1895. Since 1783 there have been British men-of-war of this name.

Majesty. See Sovereignty. Majolica, a term applied by Italian potters originally to enamelled and lustred ware, though now it includes also enamelled ware that is not lustred. The enamel is specificlustred. The enamer is specifically tin dioxide. Tradition says that this type of pottery was introduced into Italy by the Pisans from the island of Majorca in the 12th century. They had, however, made enamelled pottery long before that; but in the 15th century they appear to have learned, or discovered independently, the secret of the lustre of tin enamel. The classic period of the specifically Italian majolica covers the 15th and 16th centuries; the principal seats of its manufacture were Forli, Fa-enza, Pesaro, Urbino, Gubbio, and Castel Durante; and amongst the more famous masters of the art were Giorgio Andreoli (work dated 1517-37) of Gubbio, and F. X. Avelli, Guido Fontana, and Niccola da Urbino, at Urbino and Castel Durante. Much of this ware was highly decorated and painted in blue, ruby, yellow, 'silver,' gold,' and other colours, which were put on sometimes before, sometimes after, the firing. The white enamel was composed of thirty parts of powdered glass mixed with twelve parts of tin dioxide. Majolica continued to be made in Italy during the 17th and 18th centuries, and the classic types are cleverly produced at the present day. The term mezzamajolica was used by early Italian writers to mean ware that was covered with a white clay 'slip' instead of the tin enamel. See Falke's Majolika (1896), Drury and Fortnum's Maiolica (1896), and Vanzolini's Istoria delle Fabbriche di Majoliche (1879).

Major, a military rank, next in degree above that of captain and below that of lieutenantcolonel. Formerly every cavalry regiment and battalion of infantry had two majors; but the rank was suppressed in the artillery and engineers for a long period. In 1881 Mr. Childers gave every cavalry regiment and infantry battalion four majors; but of these one is second in command of the unit, and practically of higher position than the other three, who command companies as captains, and are majors in little more than name. In the Royal Horse and Royal Field Artillery the major is the commanding officer of a battery; in the Royal Garrison Artillery and Royal Engineers majors com mand the companies. In all other European armies where this rank exists it applies to the officer commanding a battalion or corresponding body.

Major, or Mair, John (c. 1470-1550), Scottish historian and divine, was born at Gleghornie, E. Lothian. He taught, after 1496, at the Sorbonne and Montaigu colleges in Paris, returning (1518) to Scotland as professor at Glasgow University, where John Knox and Patrick Hamilton were his pupils. He removed (1522) to St. Andrews, followed by George Buchanan, also a pupil. He was again at Paris, as 'chief of the scholastic philosophy' (1525-31); and when he returned to St. Andrews, was provost of St. Salvator's College till his death. His most important work, a History of Greater Britain (1521), a critical narrative, has been done into English by the Scottish History Society, and contains his biography (1892).

Majorca (Sp. Mullorca), largest of the Balearic Is., in the Mediterranean, 115 m. s.s.e. by s. of Barcelona; measures 60 m. by 45 m. Area, 1,310 sq. m. The soil is very rich, and produces subtropical products. The country is hilly. The climate is oppressive and relaxing during most of the year, owing to the great dampness of the air; but the island is fairly healthy, especially since the drainage by an English company of the great Albufera morass at Alcudia in the N. (1864-70). The race is much mixed, with Greek, Celtic, Carthaginian, and Provençal strains, and there are many Celtic remains. The Moorish kingdom of Mallorca was conquered by Jaime of Aragon (1282), and in 1343 incorporated in Aragon. Pop. (1900) 248,194.

Majority. At the age of twenty-one, according to the law of both England and Scotland, a person attains his or her majority and becomes sui juris, or of full legal capacity. As the law takes no account of a fraction of a day, a person attains his majority on the day before the twenty-first anniversary of his birth. (See INFANTS, MINOR, and PUPIL.) The right of a majority to bind a minority exists only by custom, statute, or agreement: by custom in the case of public assemblies and courts of justice; by statute in the case of oreditors under the Bankruptcy Acts; and by agreement expressed in articles, or some constitutive document in the case of partnerships, companies, bodies of trustees, etc.

Majuba Hill, height of the Drakenberg range, N.W. Natal, British S. Africa; is noted for the defeat of the British by the Boers on Feb. 27, 1881, General Sir George Colley being killed in the action. Majunga, or Mojanga, chief port on N.W. coast of Madagascar, on N. side of Bay of Bombetoke. The trade in 1904 was valued at over £300,000. Pag. 6,000

wraue in 1904 was valued at over £300,000. Pop. 6,000.

Makalla, or Mokalla, seapt., Arabia, 300 m. N.E. of Aden, is the chief port of Hadramaut.

Pop. 18,000.

Makarov, STEPAN OSSIFO-VITCH (1848 - 1904), Russian admiral, was born at Kiev. During the Russo-Turkish war of 1877 he tiaz et l'Océan Pacifique (2 vols.

Makart, HANS (1840-84), Austrian painter, was born at Salzburg; was a pupil of Piloty at Munich (1861-5). He first won fame by Amorettes and The Seven Deadly Sins (1868), in which his love for gigantic dimensions and gorgeous colour effects finds full expression. In 1869 he settled at Vienna, and in 1879 was made professor at the art academy

lectured at Damascus on the Moors in Spain. These took shape as his Histoire Générale des Arubes d'Espagne (1855-61; Eng trans., in part, 1840-3).

Mako, tn., Csanád co., Hungary, on r. bk. of river Maros, 19 m. E. of Szegedin; has a fine episcopal palace. Pop. (1900) 33,701.
Makololos, South African people of mixed Bechuana stock,

Makololos, South African people of mixed Bechuana stock, who moved to the Zambezi about 1835. Here they overthrew the Barotse rose against them, and exterminated them to a man, except a few chiefs, then absent.

Makrizi, Taki-ED-DIN AHMED Et- (c. 1364-1441), Arabic historian, born at Cairo, and famous for a History and Topographical Description of Egypt, of which a French translation appeared in 1895. He also wrote, or rather compiled, histories of the Fatimites, and of the Ayyubid and Mameluke sovereigns of Egypt (French trans. 1837-44), and an encyclopædia of Egyptian biographies.

Malabar, maritime dist. of S.W. Madras, India, stretching for 145 m. along the coast, and extending inland to the W. Ghats, but also including the town of Cochin. There are extensive forests. Rice, coffee, pepper, and cocoanuts are other important products. Area, 5,585 sq. m. Pop. (1901) 487,484.

Malabari, Behramji Merwanji (1853), Indian author and reformer, born at Baroda; identified with movements for the intellectual advance of India, and a strong advocate for the reform or abolition of various social abuses and customs, such as infant marriage and the remarriage of Hindu widows. He is the author of The Indian Eye on English Life (1891). His Life was written by Menant (1898).

Malacca, colony and th...Malay Peninsula, and the largest of the Straits Settlements. Area, 660 sq. m. (1.) The colony consists of a strip, 40 m. long by 25 m. broad, along the coast. The country is formed of undulating hills of moderate elevation, behind which rises Mt. Ophir, or Gunong Ledang (3,840 ft.). The coast lands are generally low and swampy, but are well timbered. The rainfall is heavy. Imports (1904), £4,087,019 (including bullion and speciel, and exports, £3,357,474. Pop. (1901), consisting chiefly of Malays and Chinese, 95,487. (2.) Town, on Strait of Malacca. 2° 11½ N. In 1511 it fell into the hands of the Portuguese, from whom it was taken by the Dutch in 1641. In 1825 it was exchanged with the British for Bencoolen in Sumatra. Malaccais a free port. Here are an Angle-Chinese college and a govern-



Majolica Vase by Maestro Giorgio of Gubbio.

torpedoed several Turkish warships. After carrying out valuable hydrographical work in the Black Sea, Mediterranean, and N. Pacific, he became governor of Kronstadt (1899–1904), and in February of the latter year was given command of the Russian fleet in the Far East. He perished in the destruction by a mine of his flagship, the Petropavlovsk, two months later. Makarov designed the ice-breaker Yermak (1898) and the collision-mat used in all navies. He wrote Le Vi-

there. His other principal works include The Homage of Venice to Catherine Cornaro (1873), Cleopatra on the Nile, Entrance of Charles V. into Antwerp (1878), The Death of Cleopatra, and The Spring. He had a fondness for sensuous but lifeless human forms, and for faded leaves and flowers. See Life, in German, by Von Lützow (1886) and by Stiassny (1886).

Makkari, ABU'L ABBAS AHMED EL- (c. 1585-1631), Arabic chronicler, born at Tlemçen, Algeria. He lived at Fez and at Cairo, and ment hospital. The chief exports are tin, rice, tapioca, pepper, nutmegs, mace, sago, buffalo hides and horns, rattans, gutta-percha, gum, coffee, and opium. (3.) STRAIT OF, the channel separating the Malay Peninsula from Sumatra and the adjacent islands. It is about 550 m. long, and varies in width from 185 m. in the N. to 35 m. in the s. Both shores of the strait are fringed with shallow mud-banks.

Malachi, the last of the books of the Old Testament, and in the Hebrew canon the last of the twelve minor prophets. It contains denunciations upon priests and people for their polluted sacrifices, their mixed marriages, their neglect of tithes and offerings, and their pride; and it likewise pronounces the threat of penalty, and the promise of the Messiah, who is to be preceded by a divine messenger (Elijah). The writer lived after the return from the captivity, and was probably contemporary with Ezra and Nehemiah (c. 460 B.C. and later). There has been much discussion among scholars as to whether Malachi was the proper name of the prophet (Hitzig, Vatke, Orelli, Robertson) or a general name prefixed to an anonymous work and (probably) borrowed from 3:1 (Ewald, Kuenen, Wellhausen, Robertson Smith, G. A. Smith). The style shows a considerable decadence from the pathos and grandeur of the great prophetic age; but in its play of question and answer the book reveals no small dramatic power, and it has enriched Christian literature with a relatively large number of memorable utterances (cf. 1:2, memorarie utterances (c). 1:2, 3, 11; 3:1 f., 8, 17; 4:2, etc.). See Commentaries by Köhler (1865), Pusey (1877), Nowack (1897), G. A. Smith (Expos. Bible, 1898), Perowne (Camb. Bible).

Malachite, basic carbonate of copper, CuCO₃Cu(OH)₂, is of wide distribution, but occurs chiefly in the Urals, in nodular or mamillated masses of stalagmitic origin. It is of emerald green colour, and somewhat soft (h. = 3'5, sp. gr. about 3'9). Malachite is of value as a source of copper, but is chiefly used for ornamental purposes, on account of the beautiful colour and markings brought out by polishing.

Malachite Green, or BENZAL-DEHYDE GREEN, C₆H₅COH(C₆H₄N. (CH₃)₂), is a compound derived from triphenyl-methane, and obtained by heating benzaldehyde (oil of bitter almonds) with dimethyl-aniline and zinc chloride, followed by oxidation. It is itself colourless, but it loses water and forms bright green salts. The double salt with zinc chloride is used as a brilliant but somewhat fugitive green dye. Malachy, St. (1094-1148), archbishop of Armagh, associated himself with Malchus, bishop of Lismorc, and afterwards became head of the abbey of Bangor, Co. Down, and bishop of Connor (1124). As archbishop (11326) he effected great reforms, and was appointed papal legate by Innocent II. He died at Clairvaux, on his way to Rome. His friend St. Bernard wrote his Life, which is extant.

Malacology. See MOLLUSCA. Malacopterygil, a name given by Cuvier to 'soft-finned' bony fishes—i.e. to those in which the dorsal fin is supported by soft rays instead of spines. The word is still used as an adjective to describe this condition, but no longer gives its name to a subdivision.

Malacostraca, the higher Crustacea, as contrasted with the small, simple forms (Entomostraca). See CRUSTACEA.

Maladetta (Fr. Monts Maudits), group of grantic peaks, wild and precipitous, in Central Pyrences, Spain, separating the valleys of Benasque and Aran. It contains Pie d'Anethou (11,170 ft.), the highest summit of the Pyrences. It is best reached from Bagnères de Luchon.

Malaga. (1.) Mountainous prov., S. Spain, forming part of ancient kingdom of Granada, bordering on the Mediterranean. The climate is almost tropical in summer, and very mild in winter, the fertility and beauty of the province being unequalled even in Spain. Mining and agriculture are busy and progressive, and wine is produced. Area, 2,812 sq. m. Pop. (1900) 511,989. (2.) City, cap. of above prov., 82 m. s.s.e. of Cordova. It is a port on the Mediterranean, with export trade in fruits and wine, and cane-sugar and distilling industry. Of Phoenician origin, it was for centuries a Moorish city and one of the principal ports of the kingdom of Granada. Ferdinand the Catholic captured it, after a long siege, in 1487. The Moorish fortress (Alcazaba) has now dis-appeared. The town is straggling, but is picturesquely surrounded by gardens and vine-yards, and almost enclosed by mountains. The cathedral is a vast structure, mainly Gothic. The climate in winter is beautifully mild, and favourable for invalids. Off the town was fought, on July 23, 1704, a naval battle between the Anglo-Dutch fleet and the Franco-Spanish fleet, the result being indecisive. Pop. (1900) 130,109.

Malaga, white Spanish wine, very full-bodied, luscious, and sweet; contains from 12 to 18 per cent. of alcohol by volume. It closely resembles Alicante.

Malakoff. (1.) Town, dep. Seine, France, S.W. suburb of Paris. At first it was known as California, but acquired its present name after 1848. Pop. (1901) 14,341. (2.) One of the chief defences of Schastopol, Crimea. The French carried it by storm, Sept. 8, 1855, and its fall immediately preceded the evacuation of Sebastopol.

Malan, CÉSAR HENRI ABRA-HAM (1787-1864), Swiss Protestant divine, born at Geneva, pastor of the state church there. He was the composer of the music of Chants de Zion (1826), and author of The Church of Rome (1844), Pictures from Switzerland (1852), Stories for Children (1852). See Life by his son, S. C. Malan (1869).



Malapterurus.

Malapterurus, the genus to which belongs the e.ectric cat-fish, also called electric sheath-fish. The most important species is M. electricus, which grows to a length of four feet, and is found in the Nile. The electric organ extends throughout the whole body. See Electric Eel, and Cat-Fish.

Mälar, lake of Sweden, 70 m. long, ½ to 30 m. broad, with an area of 460 sq. m. Its surface is only from 1 to 2 ft. above sealevel. It flows into the Baltic through the city of Stockholm and the Södertelge Canal. The sea-water, however, often streams into the lake, the cause being probably a difference of atmospheric pressure on the lake and the sea respectively. It is studded with over a thousand islands. On them or its shores stand the royal palaces of Gripsholm, Ulriksdal, Drottningholm, and Haga. It is connected on the w. by the Arboga Canal with Lake Hielmar.

Malaria, also AGUE, MIASMA, and INTERMITTENT FEVER, a specific infective disease, commonest in warm, marshy districts. It decreases in frequency generally in cultivated districts, as drainage improves; though near Rome, where ever every every though near they increased it. The cultivation of rice has also been stopped in certain places for the same reason. There are various types of malaria, the best known being the tertian (recurring every third day during the attack), the

quartan (every fourth day), the quotidian, the tropical or malignant (so called because of its locale and severity), and autumno-æstival, which tends to attack in spring and autumn. All, as far as is known, have like sources of infection—viz. the mosquito, of the species Anopheles, which carries the microorganism of the malaria from the blood of one man to the blood of another.

Course of the Disease. - The period of incubation is not precisely known, but is believed to vary with the different types between two and fifteen days. The first symptoms resemble those of many fevers. There are languor, general discomfort, chilliness, and depression, with influenza-like pains in the limbs, back, and eyes. All these symptoms may come and go once or twice before the true attack begins. Then the chilliness becomes aggravated into a violent shivering fit, with chattering teeth, and possibly diarrhea and vomiting, and ringing sounds in the ears. For half an hour or an hour no amount of external warmth or covering can make the sufferer feel warm, though his temperature is above normal all the time the paroxysm lasts, and may gradually go as high as 106° F. in an ordinary attack, much higher in the malignant type. Then comes a period during which the sufferer feels intensely hot, though possibly the body temperature is no higher, or only a degree more than during the chilly stage. This may last four or five hours, and then profuse sweating begins. With this there is a general improvement, the temperature falling, the pain disappearing, and sleep generally coming on. Another attack follows in twenty-four, forty-eight, or seventy-two hours, according to the type of malaria, and so on for some time, the attacks generally gradually lessening in severity, until they cease altogether; but in the malignant or tropical type exhaustion and death may be the end, generally due to extreme debility following several attacks. In other varieties, though death may result, it is much less common, and the chief result in ordinary cases is a long-continued anamia, due to the destruction of red blood corpuscles by the specific organism

of malaria which lives in them.

The victim to malaria has a characteristic appearance, due to the deterioration of the blood. He is sallow, wasted, languid, and with his muscular and mental strength much reduced. His spleen is the organ most affected. It is greatly enlarged, often to many times the normal size

(ague-cake); and a frequent complication in malaria is injury to the enlarged spleen through a slight blow, which may cause death by rupture and consequent hæmorrhage. There are various diseases with which malaria may be confused, particularly in the early stages and in the case of the malignant type. Influenza, typhoid fever, and abscess of the liver are perhaps the commonest. Microscopical examination of the blood will settle the matter. In case that be impossible, then if the sufferer does not rapidly improve under quinine and other appropriate treatment, the case is either not malaria, or it is not of the malignant type. The malignant form is characterized by its comparatively gradual onset, its failing to respond to quinine, and its fever gradually becoming remittent—i.e. practically constant, though lessened at intervals, instead of leaving the sufferer altogether at regular periods. The temperature in the malignant form tends to be very high. In fatal cases it may rise as far as 110° F., or even 112° F. Other grave complications are mania, paralysis, dysentery, or choleraic symptoms. Malaria so weakens the constitution as to make it common for other discases to follow, and to be severe in their attacks.

Treatment.-It was long known that those exposed to night air in marshy districts were particularly liable to attacks of ma-laria; it was known, too, that swampy forests were dangerous in that respect even by day; but the disease was always attributed to foul gases, decomposing vegetable matter, and so forth. In 1847 Meckel of Vienna found that malaria was associated with black microscopic bodies in the blood; but he did not decide their nature or their influence. In 1880, Laveran, a French army surgeon, announced not only that malaria was a parasitic disease, but that the parasites could be seen as crescent-like bodies in the red blood corpuscles. Golgi, an Italian, showed that there was a difference, microscopically, between the parasites present in the blood in the different types of malaria -quartan and tertian-and also pointed out that the return of a high temperature coincided with the production of spores. Manson, in 1894, suggested that there existed a means of transference from one human being to another, and that the mosquito might serve that purpose. Nott had hazarded this suggestion as far back as 1848, and Laveran also thought it possible; but it was left to Ross of the Indian Medical Service to prove it; and Grassi, Bignami, and Manson all

brought corroborative evidence. It has now been proved by experiment that if mosquitoes are fed upon malaria patients, they can communicate malaria to those upon whom they feed later, the malaria being always of the same type—tertian, quartan, etc. La-boratory-bred mosquitoes, which have never been allowed to feed upon malaria patients, cannot inoculate any one with malaria. The microscope has given further evidence of the virtue of what has long been the universal remedy—viz. quinine. The microscope shows that this remedy prevents the young parasites from developing, though it does not seem to affect the mature ones; hence reproduction in time ceases in the human body. The microscope also shows that reproduction of the parasite in the human subject takes place by sporulation, though in the mosquito the parasite reproduces sexually. The microscope also shows that it is the female mosquito which carries the disease from one human host to another. When malaria is feared, about five grains of quinine are taken per diem, by the mouth. At the beginning of an attack ten or fifteen grains should be taken in a single dose, followed by five or ten every four hours. The dose is gradually lessened; but quinine must be taken for about a month after an attack. In the malignant type sporulation goes on in spite of quinine. When vomiting prevents the drug from being re-tained, it can be injected by the bowel, or by a vein, or intra-muscularly. In addition the suferer is fed on light but nutritious food, is kept in bed between blankets, and encouraged to take copious hot drinks. Moreover, the breeding places of mesqui-toes—damp, warm spots—must be drained, or the pools where the mosquito larva develop must be made uninhabitable. This has been successfully accomplished in some instances by covering the water surface with paraffin, or some other fluid which excludes the air. By these methods a marvellous improvement has been effected in the reduction of malaria in many tropical countries. At night mosquito-nets should be used, and various oily prepara-tions may be smeared over exposed parts.

Malatia (anc. Melitina), tn., Asiatic Turkey, 90 m. N.w. of Diarbekir. Fruit culture is the chief industry; opium is also grown; and there are deposits of copper. It suffered considerably from an earthquake in 1893, and in 1895 was the scene of a massacre of 3,000 Armenians. Pop. 30,000.

Malayalam. See Tamil.

Malay Apple, a name sometimes given to the rose-apple or sambos, Eugenia sambos, an East Indian tree, bearing long shining leaves and yellowish edible fruits, not unlike apricots in flavour. It may be grown in the stove-house.

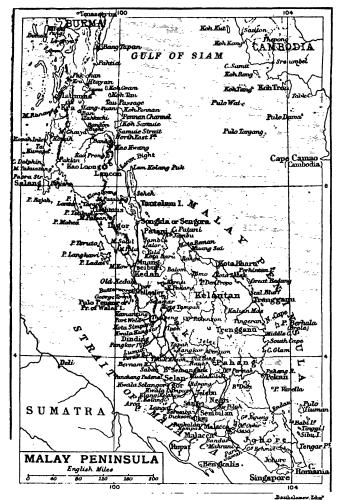
Malay Archipelago, or Ma-LAYSIA. See EAST INDIES. is sandy. Immense deposits of alluvial tin occur in many places. The climate is damp, not very hot, and fairly uniform throughout the year, heavy rain being liable to fall at any season. The mountains and much of the flat country are still buried in primeval forests. The principal races are Malays and Malayo-Siamese

are essentially maritime, and although they have modified their piratical habits, they have never occupied the interior of any country except Sumatra, which they regard as their ancestral home. It is generally held that they form a branch of the Mongoloid stock; but so varied are their physical characters that it is safer not to regard them as belonging to any one race. Witty and even brilliant in conversation, dignified and even refined in intercourse with strangers, they have never produced a literature or an art. Most of the definitely Malay tribes profess Mohammedanism. but practise magic and ancestorworship. Their dialect is closely akin to those of the South Sca islands, and has become to some extent the lingua franca of the Far East. They are poly-syllabic, untoned, profuse in particular, poor in general terms, apt for irony, simile, and meta-phor. Their most characteristic product is the kris, a thrusting weapon of many shapes. They are subject to fits of peculiar frenzy of a homicidal tendency, Skeat's Malay Magic (1900); Maxwell's Manual of the Malay Language (1899); Wilkinson's Language (1899); Wilkinson's Malay-English Dictior ary (1903); Annandale and Robinson's Fasciculi Malayenses; Skeat's Tribes of the Malay Peninsula (1905); and many recent works by Clifford and by Swettenham.

Malay States (FEDERATED) occupy the centre of the Malay Peninsulla, and have an area of 26,300 sq. m. They comprise Perak, Selangor, and Negri Sembilan on the w. and Pahang on the E. There is tin-mining in Perak and Selangor. Negri Sembilan is mostly agricultural, and much of Pahang remains unexplored. Pop. (1901) 678,595, of whom 312,486 were Malays, 299,739 Chinamen, and 1,422 Europeans and Americans. The governor of Singapore is high commissioner of these states; but each state has a native ruler, who acts under a British resident. The imports in 1904 totalled £3,686,713; and the exports £7,369,698, the chief export being tin (51,000 tons in 1905) and the chief import rice. The principal products are coffee, sugar, pepper, gambier, and tapicoca. The forests yield timber, resins, canes, and gutta-percha. The state of Sungei Ujong was incorporated with Selangor in 1894. In 1887 Pahang accepted

Malchin, tn., Mecklenburg-Schwerin, Germany, between Lakes Malchin and Kummerow, 25 m. E.S.E. of Güstrow. It has railway workshops. Pop. (1900) 7,449.

British protection.



Malay Peninsula, The, reaches down from the mainland of Asia to within 2° of the equator; its extreme length is nearly 700 m., and its greatest breadth about 180 m. Its northern boundary is the isthmus of Kra, while the island of Singapore lies off its scuthern point. The interior is occupied by a range of mountains (8,000 ft. to 10,000 ft.). The soil of the coast region

half-breeds. The population exceeds 2,000,000. See further under MALAY STATES, SIAM, and STRAITS SETTLEMENTS. For bibliography, see MALAYS.

Malays, a brown-skinned, straight - haired, round - headed people, of low or medium stature, living in all the islands between Madagascar and the Philippines, but centred chiefly in the Malay Peninsula and Sumatra. They

Malcolm I. (MacDonald), king of Scotland (943-954), annexed Moray, and received Cumberland from King Edmund (945).—Malcolm II. (MacKenneth), king of Scotland (1005-34), acquired Lothian and Cumbria north of Solway; he was the first to bear the territorial title 'Rex Scotiæ.'
—Malcolm III. (Canmore), made four invasions of England; two (1070 and 1091) in favour of Edgar Atheling being followed by counter-invasions, when he submitted. Having invaded North-umberland, he was ambushed and slain at Malcolm's Cross (1093). He married (1067) Margaret, sister of Edgar Atheling.—Malcolm IV. ('the Maiden'), king of Scotland (1153-65), great-grandson of Canmore. When Somerled of Argyll rebelled, Malcolm surrendered to Henry II. (1157) Northumbria, Cumbria, also the strongholds of Newcastle, Bamborough, and Carlisle, receiving in return the shadowy earldom of Huntingdon.

Malcolm, Sir John (1769-1833), Indian administrator and diplomatist, was born at Westerkirk, Dumfriesshire; entered the service of the East India Company in 1782. His first diplomatic post was that of assistant-resident at Haidarabad in 1798; in the following year he was appointed to the Mysore Commission, and between 1801 and 1810 thrice visited Porsia as plenipotentiary. He drew up the peace negotiations with Scindia and Holkar in 1802, and arranged terms with the Peshwa in 1817. He was governor of Bombay from 1827 to 1831. His Administration of India (1833), History of Persia (1815), and Life of Lord Clive (1836) are his best known books.

Malda, dist., Eastern Bengal and Assam, India, E. of the Gangos. It is 1,813 sq. m. in area, and is engaged in the indigo and silk industries. The headquarters are at English Bazar. Pop. (1901) 884,030.

Maldeghem, tn., prov. E. Flanders, Belgium, 6 m. w.N.w. of Eecloo. Industrics include lace-making, fine basket-work, and tanning. Pop. (1990) 9,917.

Malden, city, Middlesex co., Massachusetts, U.S.A., 5 m. N. of Boston, of which it is a suburb, It manufactures rubber goods. Pop. (1900) 33,664.

Maldive Islands, cluster of coral islands in Indian Ocean, 500 m. s.w. of Ceylon. None are more than 20 ft. above sea-level. Mali is the residence of the sultan, who pays tribute to the Ceylon government. Cocoanuts, cowrie shells, and coir are exported. The inhabitants resemble the Sinhalese, and are Mohammedans. The climate is unhealthy. Pop. (1901) 30,000.

Maidon. (I.) Municipal bor. and seapt., Essex, England, at the confluence of the Chelmer and the Blackwater, 44 m. E.N.E. of London. Industries include ironfounding, manufacture of agricultural implements, fishing, brewing, and salt-making. Near the town are remains of the Premon-

Norway, and Byrhtnoth, the 'alderman' of the East Saxons. No description can give an adequate idea of the vivid realism of this poem. It is a fragment of some 650 lines. The text is in Sweet's Anglo-Saxon Reader, and there is a translation in Freeman's Old English History.



Malays: Types, Village, and Weapons.

stratensian Abbey of Becleigh. Pop. (1901) 5,564. (2.) Town, co. Talbot, Victoria, Australia, 89 m. N.N.w. of Melbourne. Pop. 2,800.

Maldon, THE BATTLE OF, an old English poem describing the battle fought in 991 A.D., between Olaf Tryggvason, later king of

Maldonado, cap. of dep. of same name, in S.E. Uruguay, S. America, on the N. side of estuary of La Plata, 67 m. E. of Montevideo. It is a fortified naval station and a seaside resort. Its fine harbour is well sheltered. It exports hides and cattle, and has limestone quarries.

Malebranche, NICOLE (1638-1715), French philosopher, born in Paris, and became a Roman Catholic priest. In his philosophy the general features of the system of Descartes were combined with elements derived from Platonism. According to Malebranche, we know nothing of the external world directly; we know external things only as they exist in idea in the divine reason, the ideas of them being presented to our minds on occasion of the corresponding impressions being made upon our bodies. The real existence of the external world itself thus becomes for Malebranche (as Christian believer rather than as philosopher) an article of faith, involved in the doctrine of creation. While his philosophical position has a cert in resemblance to that of Berkeley, Malebranche is more directly connected with English philosophy by means of his disciple John Norris, an acute critic of Locke. Malebranche's two chief works are Recherche de la Vérité (1674; Eng. trans. 1694), and Entretiens sur la Métaphysique (1688). See Lives, in French, by André (1886) and Joly (1901).

Male Fern, the popular name of the commonest of British indigenous ferns, Aspidium filix mas or Lastrea filix mas. It is a robust growing species, with sturdy, green, bipinnate fronds, often three feet or more in length, usually forming a sort of truncated inverted conical tuft round a central crown. The stipe is densely scaly, the sori are circular, and the involucre is reniform. The dried rhizome is used in medicine as a cure for tapeworm. Little or none becomes absorbed into the system, but powerful peristaltic contractions are set up in the course of a couple of hours or less. The male fern and many of its varieties are valuable hardy plant, for garden and woodland.

Maler Kotla, chief tn. of Maler Kotla state, Punjab, India, 30 m. s. of Ludhiana. Pop. (1901) 21,122. The state has an area of 162 sq. m., and a population (1901) of 77,506.

Malesherbes, Christier Gull-LAUME DE LAMOIGNON DE (1721-94) French statesman, born at Paris. In 1750 Malesherbes, who had become a counsellor of the Parlement of Paris, succeeded his father as president, and became superintendent of the press. In 1770 he was exiled with the other members of the Parlement of Paris. On the accession of Louis xvi., in 1774, he not only regained his post of president of the Court of Aids, but was made minister of state. His views were patriotic and enlightened; but finding that he could not secure the adoption of his liberal policy, he resigned in May 1776, and resided in Switzerland till 1786. In that year he was recalled, and drew up two memoirs, On the Calamities of France, and The Means of Repairing Them. But his advice was not taken, and he again retired. On the trial of the king Malesherbes offered his services as advocate. This roused the hostility of the Jacobins, and in April 1794 he was executed. See Lives, in French, by Dubois (cd. 1806) and Dupin (1841).



Male Fern (Lastrea filix mas).

1, Frond; 2, lower surface of frond, showing clusters of spore cases.

Malet. See MALLET.

Malet, LUCAS. See KINGSLEY. Malet, Sir EDWARD BALDWIN (1837), British diplomatist, born at the Hague; was charge des archives in Paris during the commune; minister plenipotentiary at Constantinople (1878-9) and at Brussels (1883); ambassador at Berlin (1884-95); and a member of the International Arbitration Court at the Hague (1900). Author of Shifting Scenes (1901).

Malherbe, FRANÇOIS DE (1555-1628), French poet, generally regarded as the founder of the classical school, was born at Caen, and attached himself to Henry IV., and to his successor Louis XIII. He insisted on correctness and elegance of diction, and his

own verses are the best illustration of the bad effects of trying to make the muse walk in fetters, even when these are gilded and polished. His Œuvres Complètes were edited by Lalanne (1862-9). See also Sainte-Beuve's Causeries, vol. viii., and Gournay's (1862) and De Broglie's (1897) Lives, in French.

Malibran, MARIA FELICITA (1808-36), operatic singer, born in Paris, a daughter of the Spanish tenor Manuel Garcia. She made her début in 1825 in London, carrying the musical world by storm. From 1830 she sang continuously in Paris, Rome, London, and elsewhere.

Malic Acid, hydroxysuccinic acid, COOHCH2CH(OH)COOH, is a dibasic hydroxyacid occurring in unripe fruits, particularly in the berries of the mountain ash, from which it may be obtained as a calcium salt by boiling with milk of lime. It may prepared synthetically by boiling bromosuccinic acid with silver oxide and water, and forms hygroscopic crystals (m.p. 100° C., sp. gr. 156), which in the case of the synthetically prepared variety are a mixture of dextro and levo rotatory forms, the natural variety being dextro-rotatory. Malic acid on reduction yields succinic acid, and when heated loses water, and yields the iso-meric fumaric and maleic acids. Malice. The word is used in

different senses. In criminal law malice, not in the sense of malevolence, but in that of criminal intention, is an essential ingredient in every crime; and in the case of murder a further kind of malice, called 'malice aforethought,' must be present. (See MURDER.) In the case of civil wrongs the presence or absence of malice in the sense of bad motive is, as a general rule, immaterial. The exceptions are:—
(1) Actions for slander of title; (2) actions for malicious prosecution; (3) maliciously inducing others to break their contracts. The question of malice also becomes important in actions for defamation, in which the defence of privilege, when it is set up, may be rebutted by evidence of actual malice. An act lawful in itself is not converted by a malicious or bad motive into an unlawful act so as to make the doer of the act liable to a civil action. There is a presumption as to infants between seven and fourteen that they cannot commit a felony; but this presumption is rebutted by evidence of malice—i.e. conscious wrongful intent.

Malicious Injury to Property. The various criminal acts constituting malicious injury to property are dealt with by the Malicious Damage Act. 1861. In

every case the act must be done 'unlawfully and maliciously;' and malice towards the particular owner of the property need not be proved-it is sufficient to prove a general intent to injure. The following are offences: -(1.) For persons to riotously assumed demolish buildings or machinery: penal servitude for life. (2.) Riotously injuring buildings or machinery: seven years. (3.) Tenants damaging their houses: a misdemeanour. (4.) Damaging goods in course of manufacture or weaving, etc., machinery: penal servitude for life; other machinery: seven years. (5.) Damaging shrubs, etc., over £1 in value in a garden, or over £5 in value elsewhere: penal servitude for five years. (6.) Damaging trees to value of a shilling: three months or £5. (7.) Destroying vegetables in garden: six months; not in garden: one month. (8.) Damaging walls, etc.: £5 fine. (9.) Flooding coal mine or damaging mine engine . seven years. (10.) Destroying sea or river banks: penal servitude for life. (11.) Damaging fishery or poisoning fish: seven years. (12.) Destroying bridge: penal servitude for life. (13.)Attempting to throw a train off the line: penal servitude for life. (14.) Injuring telegraphs, etc.: two years. (15.) Destroying two years. works of art in museums and public places: six months. (16.) Killing or maining cattle: fourteen years; other domestic animals: six months. (17.) Exhibiting false lights for ships: penal servitude for life. (18.) Removing buoys: seven years. (19.) Destroying wreeks: fourteen years. (20.) Other offences with over £5 damage: five years or £5 compensation. In Scotland malicious injuries are punishable at common law, but various statutes also deal with certain cattlemaining, railway offences, damages to fishing boats, submarine cables, and post-office offences. (See also Arson.)

Malicious Prosecution. If a man is prejudiced in his person or property by a malicious criminal prosecution, he has a right of action against the wrongdoor. In an action for malicious prosecution the plaintiff, to succeed, must prove (1) that he was innocent; (2) that there was want of reasonable and probable cause for the prosecution; (3) that the prosecution was initiated maliciously—i.e. from an indirect or improper motive, and not in the furtherance of justice. Actions will also lie for maliciously making a man bankrupt, or having him arrested, petitioning to wind up a company, or obtaining a search warrant. See Stephen's Malicious Prosecution (1888). Malignant Pustule. See AN-

Malignants, a name generally applied by the Puritans to the supporters of the king against Parliament, and even as a term of reproach to the kings themselves. It was originally used to designate men such as Laud and Strafford, who urged the king to maintain his absolute and arbitrary attitude. After the restoration it was used by the Covenanters and others as descriptive of those in authority.

Malindi, cap. of dist. of Malindi, British E. Africa, 70 m. N.E. of Mombasa. Pop. 5,000. The district has about 10,000 in-

habitants.

Malines, or Mechlin, tn., Belgium, 13 m. s.s. E. of Antwerp; is the see of the cardinal-primate of Belgium, and is noted for its vast Gothic cathedral, dating partly from the 13th century, and containing Van Dyck's Crucitixion and Rubens's Last Supper. Other works of Rubens are in the churches of Notre Dame and St. John. Among other interesting buildings are the Cloth Hall, the law courts, and the archbishop's palace. Formerly important for lace, shawls, and linen, its chief manufactures are woollen goods and 'Gobelin' tapestry, with cabinet-making and cirpentry. Pop. (1900) 55,705.



Mallard.

Mallard, or COMMON WILD Duck, a bird which is widely distributed over Europe, Asia, and N. America, but is now not very common as a breeding species in Britain. The term mallard is strictly applicable only to the drake, but it is convenient to use it for both sexes. In the drake the head is green with a white collar, the back of the neck and the breast dark chestnut, the rump black, the wing-spot green-ish purple fringed with white, and the under surface grayish white. The four central upper tail coverts are black and curly. The female is brown and buff, with a green wing spot, and is smaller than the male. In captivity the bird breeds freely with almost any species of duck.

Mallarmé, STÉPHANE (1842-98), French poet and man of letters, born in Paris. His verses contain much that is beautiful

in sentiment and crystallized in mode of expression; but owing to the theorizing nature of his temperament and the sway of a too critical faculty, his ideas were often clouded and obscure. In 1888 he issued a translation of the poems of Edgar Allan Poe. His Poésies Complètes appeared in 1887 (new cd. 1899), and a volume of Vers et Prose in 1893.

Malleability, the property, almost exclusively possessed by a number of the metals, in virtue of which they can be flattened by hammering or pressure with-out crushing. This feature is out crushing. This feature is most marked in the case of gold, which can be beaten out to such a degree of tenuity that one ounce will cover 189 sq. ft.

Mallee Scrub, an Australian species of cucalyptus, which forms dense thickets about eight feet in height. It will thrive in almost pure sand, and will tolerate both frost and scorching winds. Much of the cucalyptus oil of commerce is derived from this species.

Mallein, a poisonous compound obtained from the products of the bacillus of glanders, and which is used in veterinary practice to

diagnose the disease.

Malleson, George Bruce (1825-98), English writer on mili tary history, was born in London. In 1852 he served in the first Burmese war, and subsequently was sanitary commissioner in Bengal and controller of military finance. For some time he was Indian correspondent of the Times. Chief works: History of the French in India (1868; new ed. 1893); His-tory of Afghanistan (1879); The Founders of the Indian Empire (1882). He also completed Sir John Kaye's History of the Indian Mutiny (3 vols. 1878-80).

Mallet, originally MALLOCH, DAVID (?1705-65). Scottish poet

and author, was born near Crieff, Perthshire, and became a friend of James Thomson, author of The Seasons. From 1720 onwards he wrote William and Margaret, a ballad; Eurydice, a tragedy (1730-31), produced in London; Mustapha (1738-9), which met with success largely on account of its political reference. He edited the Works of Bolingbroke in 1754, and produced the masques Alfred (1740), Britannia (1755), and Elvira (1762-3). His works were published in 1759 (3 vols.), and his Ballads and Sonys, annotated by F. Dinsdale, in 1857. The masque Alfred was written in masque Alfred was written in conjunction with James Thomson, and it is uncertain whether Mallet or Thomson wrote the song 'Rule, Britannia' which is introduced. See Johnson's Lives of the Poets (1791), vol. iv.

Mallock, WILLIAM HURRELL (1849), English author, was born at Cockington, Devon. He has

written brilliantly, if not very profoundly, on religious, philosophical, and social questions, besides several novels. His writings are often highly poetic as well as divertingly humorous and sarcastic. Chief works: The New Republic (1877), The New Paul and Virginia (1878), Is Life worth Living? (1879), Property and Progress (1884), Social Equality (1882), A Human Document (1892), Romance of the Nineteenth Century (1881), The Veil of the Temple (1904), and The Recon-struction of Belief (1905).

Mallorca. See MAJORCA.

Mallow, or Malva, a genus of herbaceous plants belonging to the order Malvacea. They bear white or purplish flowers. The perennial native species M. moschata, the musk-mallow, with its white-flowered variety M. m. alba,

is the handsomest of the genus.

Mallow, tn., Co. Cork, Ireland,
20 m. N. of Cork, on the Blackwater. Remains exist of a castle, formerly a stronghold of the earls of Desmond. It has a milk-condensing factory, flour mills, and salt works. Pop. (1901) 4,542.

Malmaison, LA, château on l. bk. of Seine, 5 m. w. of Paris, France; was purchased by Joséphine Beauharnais in 1789. After her divorce from Napoleon (1809) she lived and died in it (1814).

Malmesbury, munic. bor., Wiltshire, England, 11 m. s.w. of Cirencester, on the Avon. The church of St. Mary formerly be-longed to the Benedictine abbey, founded early in the 7th century. The present edifice retains portions of Norman architecture, and in the churchyard is the detached tower of another church. A richly-sculptured market cross dates from the reign of Henry VII. Pillow lace is a domestic industry. Pop. (1901) 2,854.

Malmesbury, James Harris, Earl Of (1746-1820), English diplomatist, born at Salisbury; became minister at Berlin in 1772, at St. Petersburg (1777), and the Hague (1784). He is best known as one of the Whigs who seceded from Fox to Pitt in 1793, and as the man who was entrusted with the duty of marrying, by proxy, the Princess Caroline, whom he brought to England in 1795.— JAMES HOWARD HARRIS, THIRD EARL (1807-89), edited his grandfather's diaries and correspondence, and published his own Memoirs of an Ex-Minister (1884). Heentered Parliament for Wilton in 1841. He served as Foreign Secretary in 1852 in Derby's administration, and again in 1858-9; and later (1866-8 and 1874-6) was Lord Privy Seal.

Malmesbury, WILLIAM OF (c. 1095-1143), Anglo-Norman chronicler, was reared in the religious house of Malmesbury, of which

he was afterwards librarian. His Gesta Regum Anglorum (from the earliest times to 1127-8) and Gesta Pontificum Anglorum were fin-ished in 1125, and revised 1135-40: and De Antiquitate Glastoniensis Ecclesia was written between 1129 and 1139. The Historia Norella (sequel of the Gesta Regum) ends with Matilda's escape from Oxford (1142). See Stubbs's edition of Gesta Reyum Anglorum (1887-9).

Malmö, cap., Swedish co. of Malmöhus, on the Sound. The Earl of Bothwell was for a time imprisoned in the old castle. The artificial harbour (1775) is one of the largest in Scandinavia. Malmö has iron works, woollen mills, dockyards, machinery, sugar, steam-mill factories, and

breweries. Pop. (1900) 60,857.

Malmsey, also known as Malvoisie, a rich, sweet, luscious white wine formerly produced in Candia (Crete), Malvasia (Morea), and certain of the Greek islands. Vincs of this variety were planted in Teneriffe, Madeira, Canary Is., and the Azores. The wine contains about 19 per cent. of alcohol by volume. It is said that George, Duke of Clarence (1477), was drowned in a butt of this wine.

Malmström, Bernhard Elis (1816-65), Swedish poet, was born at Tysslinge (Nerike). His works are perfect in form, lofty in sentiment, and lucid in expression, in contrast to the romantic school, which he criticised severely. His greatest work is Angelika (1840), a series of elegies, which made him famous. He also wrote Ariadne and Fiskartickan från Tynnelsö, besides shorter poems. His Samlade Skrifter appeared in 8 vols. in 1866-9.

Malmström, CARL GUSTAF (1822), Swedish historian, became professor at Lund (1863), at Upsala and member of the Academy (1877), keeper of the Record Office (1882-7). His principal works are Sveriges Politiska Historia, 1719-72 (6 vols. new ed. 1893-1901). and Om Embetsmännens Ställning till Riksdagen under Frihetstiden (1869).

Maiolos, tn., Bulacan prov., Luzon, Philippines, 7 m. N. of Manila Bay; was the first republican capital (1899). Pop. 14,600.

Malone, EDMUND (1741-1812),

Irish author and critic, was born in Dublin. In 1777 he went to London, where he became well known in literary and political circles. In 1778 he published an Attempt to ascertain the Order in which the Plays of Shakespeare were written, which remains substantially correct. His critical and historical supplement to Johnson's edition of Shakespeare appeared in 1780. Malone's edition of the plays (1790) embodied the results of long and elaborate research. In 1800 he published The Critical and Miscellaneous Prose Works of John Dryden. A new edition of Shakespeare, for which Malone left material, was published by the younger Boswell (1821). See Life by Sir James Prior (1864), also Memoir in Boswell's edition of Shakespeare (1821).

Malonic Acid, CH₂(COOH)₂, is a dibasic acid occurring in beet, and is prepared synthetically by the hydrolysis of cyanacetic acid. It crystallizes in large tables, is soluble in water (m.p. 134° c.), and is decomposed when heated into carbon dioxide and acetic acid. Its ethyl ester is a valuable agent in the synthesis of carbon compounds.

Malope, a genus of annual hardy herbaceous plants belonging to the order Malvaceæ. They bear showy violet or rose coloured flowers, and are worth growing in

a light soil in a sunny situation.

Malory, SIR THOMAS (fl. 1470),
author of Le Morte Arthur, has been identified by Professor Kittridge - Who was Sir Thomas Malory? (1895)—with a certain Sir Thomas Malory of Newbold Revell in Warwickshire, who appears to have succeeded to the family estates in 1433 or 1434. He has condensed his matter ruthlessly, all the great prose branches (Merlin, Tristan, Lancelot, with Queste and Morte Arthur) being represented in a mutilated form. The modifications which he introduced into the text—e.g. the parting of the lovers in bk. xx., and their final meeting at Almesbury —together with the simplicity and virile force of the language, have caused among English readers an entirely mistaken view of the story, as a love story, and the morality of the Arthurian legend as a whole. The best edition is that by Dr. Sommer (3 vols. 1889 91), though the critical section is far from accurate. There is a popular edition in the Globe Scries. See also Sir Thomas Maloru's 'Le Morte Arthur' und die Englische Arthurdichtung des XIX. Jahrhunderts, by Schüler (1900)

Malpighi, MARCELLO (1628-94), Italian anatomist, born at Crevalcuore, near Bologna; was professor of medicine at Pisa, Messina, and Bologna (1666-91). He was one of the first to apply the microscope in anatomical study, and made important discoveries as to the structure of the kidneys. lungs, skin, and spleen, giving his name to various organs or parts of such. He also carried out important investigations in the anatomy of plants, his Anatomia Plantarum (1675-9) being a classic in vegetable histology. His Opere were published in

1686-1734.

Malpighia, a genus of tropical American evergreen trees and shrubs belonging to the order Malpighiaceæ. They bear pink or white flowers, followed by fleshy drupes. They are sometimes cultivated as stove plants, a peaty soil being required. M. ylabra, the Barbados cherry, is extensively cultivated for its fruit in the W. Indies.

Malplaquet, vil., dep. Nord, France, 10 m. s. of Mons; was the scene of the victory of Marlborough and Prince Eugene over the French under Villars and Boufflers on Sep. 11, 1709.

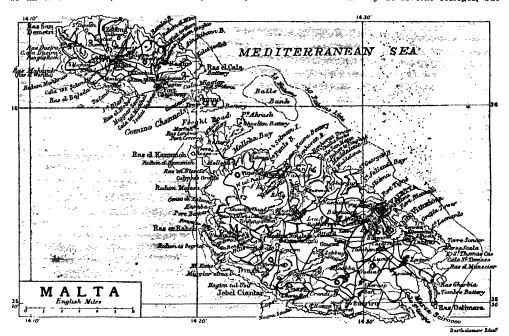
Malstatt-Burbach, tn., Rhine prov., Prussia, on r. bk. of Saar, 35 m. N.E. of Metz; has coal quarried. Filigree, lace, and lucifer matches are manufactured. Malta is a British crown colony and a strong fortress. It is one of the most important ports of call in the world, being also the naval base of the Meditorranean fleet. The common Maltese language is mainly debased Arabic. Roman Catholicism is the chief religion. The island has a university. The trade is mainly transit; in 1904–1905 the imports were valued at £9,735,859, and the exports at £8,444,024. Valetta is the capital. A railway connects it with the old capital of Citta Vecchia, 6 m. w. Pop. (1903) 193,315; garrison, about 10,115.

Malta, KNIGHTS OF. See HOS-PITALLERS.

Malte-Brun, KONRAD (1775-1826), Danish geographer, was born at Thisted, Jutland; but being exiled, he settled in France. With Mentelle and Herbin, he produced a geography of the world far superior to anything previously existing. Chief works: Précis de la Géographie Universelle (8 vols. 1810-29), Mélanges Scientifiques et Littéraires (3 vols. 1828). One of the founders of the Société Géographique.

1825). One of the foundations of the Societé Géographique.

Maltebrun, VICTOR ADOLPHE (1816-89), French geographer, son of Konrad Malte-Brun, was born in Paris. He was professor of history at several colleges, but



mines and iron works. Railway carriages and coment are manufactured. Pop. (1900) 31,195. Malt. See Brewing.

Malta (anc. Mcliud), isl. in Mediterranean, 58 m. s. of Sicily; with Gozo and Comino, it covers an area of 117 sq. m. Malta itself has an area of 95 sq. m. Its coasts are deeply indented. The highest point is 845 ft. above sealevel. The climate is mild and healthy in winter, but in summer the heat is intense. The soil is thin, but very fertile, and is cultivated with untiring energy by the natives. Corn, potatoes, vegetables, oranges, figs, and cotton are produced for export. Maltese honey is famous. Marble, alabaster, and building stone are

Malta was colonized by the Phœnicians, and thereafter held by the Greeks, and then by the Carthaginians, until the Romans took it in 216 B.C. St. Paul's Bay, on the N.E., was the scene of St. Paul's shipwreck in 62 A.D. Subsequently the island was occupied by Vandals, Arabs (870), and Normans (1090) from Sicily. After the capture of Rhodes by Solyman in 1522, Malta was granted (1530) by Charles v. to the Knights of St. John of Jerusalem. Taken by Napoleon in 1798, Malta surrendered to the British in September 1800. See Malta under the Phœnicians, Knights, and English, by Tullack (1861); and Malta and the Knights Hospitallers, by Bedford (1894).

in 1847 devoted himself to geographical studies, became general secretary to the Geographical Society, and was chief editor of Nouvelles Annales des Vouages. His chief work was La France Illustrée (1855-7; new ed. 1879-84).

Maltese Terrier, The, is reputed to have been the ladies' lapdog of ancient Rome and Greece. It is a fluffy little white snowball, weighing from 5 lbs. to 7 lbs., and without a single terrier characteristic. Points:—Coatvery long, straight, and silky, quite free from woolliness or the slightest curl; colour pure white; nose black, as also the roof of the mouth; eyes bright and dark; ears moderately long, the hair

on them mingling with that on the neck; tail short and well feathered, and curled tightly over the back.



Maltese Terrier.

Malthus, THOMAS ROBERT (1766-1834), English political economist, was born near Guildford, Surrey. In 1805 he was appointed professor of history at Haileybury—a post he retained till his death. It was Godwin's Enquiry, with its view of man's perfectibility (1797), which led him to the law that population treads ever on the limits of sub-Malthus never said sistence. there could be an excess of population. Such excess was wiped out, so to speak, before it came into existence by the checks of vice and misery. Consequently Godwin's theories were refuted by the facts of nature. The Essay on Population (1798) created a tremendous sensation at the time, and the author has probably been the best abused man in the 19th century. He almost formulated the law of diminish-ing returns, and he had elaborate controversies with Ricardo regarding rent. See Bonar's Matthus and his Work (1885).

Malton, tn., N. Riding, Yorkshire, England, 21 m. by rail from York. The church of St. Mary forms part of the 12th-century priory church. Malton has corn mills, foundries, implement works, and breweries. Pop.

(1901) 4,758. Maltose, C12H22O11H2O, a sugar produced by the action of the diastase of malt on starch, about four-fifths of the latter being changed into maltose. It forms crystalline crusts (sp. gr. 1.54), reduces Fehling's solution, is fermented by yeast, and is hydrolyzed to grape sugar by boiling with diluted acids. In constitution it is the anhydride of glucose, and is an aldehyde-alcohol, containing eight alcoholic hydroxyl groups. Maltose is optically active, rotating the plane of polarization 140° to the right. It is the main source of the alcohol in fermented malt liquors.

Malvaceæ, a natural order of herbaceous plants, shrubs, and trees, with alternate leaves and axillary flowers, each of which includes five sepals united at the base, five petals, numerous stamens—their filaments united so as to form a tube—and several carpels united in a radiate manner to form the ovary. Among the genera are Hibiscus, Malva, Althea, and Lagunaria.

Malvastrum, a genus of American herbaceous plants, bearing spikes of yellow or scarlet flowers, and belonging to the order Malvaceæ.

Malvern, GREAT, wat-pl., Worcestershire, England, 8 m. s.s.w. of Worcester, on E. slope of Malvern Hills. The parish church formerly belonged to an 11th-century Benedictine priory, and contains 15th-century stained glass. Here is Malvern College. Malvern owes its celebrity to its

and contains 15th-century stained glass. Here is Malvern College. Malvern owes its celebrity to its springs, and to its clear, dry, and equable climate. The first hydropathic establishment in the United Kingdom was erected here in 1842. Pop. (1901) 16,448. Malvern Hills, range, with

Malvern Hills, range, with abrupt heights, running 9 m. N. and S. between Worcestershire and Herefordshire, England. The highest summit is Worcestershire

Beacon, 1,395 ft.

Malwa, prov. of Central India, occupying plateau (alt. 1,500-2,000 ft.) bounded on w. by Aravalli Mts., and s. by the Vindhya chain. It contains the following feudatory states: Indore, Bhopal, Dhar, Jaora, Rajgarh, Ratlam, Narsinghgarh, and Nimach. Opium is largely cultivated.

Malwan, seapt., Ratnagiri dist., Bombay, India, 50 m. N.W. of Goa, formerly a stronghold of the Maratha pirates. Iron ore is found in the neighbourhood. Pop.

(1901) 19,626.

Mamelukes, a term derived from an Arabic word meaning 'slaves.' They were originally a body of Turkish slaves (some 12,000) whom Sultan Es-Salih Eyyüb introduced in the 13th century. After his death, and in the absence of capable successors, the Mamelukes elected a sultan out of their own number; and from that date (1251) till 1517 Egypt was ruled, and well ruled, by a succession of these military slave-kings, who are usually grouped in two lines—the Bahri (1250-1388) and the Burji (1388-1517). The occupant of the throne was the strongest man for the time being, and his successor was the stronger man who ousted him. The Bahri rulers were mostly men of Turkish blood, while the Burji rulers were principally Circassians. The rule of these kings, however tumultuous and uncertain, was enlightened, and Egypt -Cairo in particular—owes to them the most beautiful of its mosques. In 1517 the dominion of the Mamelukes was overthrown by the Ottoman Turks under Selim I., who, however, left them supreme in the provinces. In

the 18th century they were again absolute masters of the country, though nominally subject to Turkish rule. The Mamelukes made their last noteworthy appearance when Napoleon defeated them (1798) at the battle of the Pyramids. Mehemet Ali, acting for the Porte, finally crushed them in two treacherous massacres (1805 and 1811). See Makrizi's Histoire des Sultanes Mambluks (trans. by Quatremère, 1837-41).

Mamers, tn., dep. Sarthe, France, 14 m. E.S.E. of Alencon; its church of Notre Dame dates from the 12th century, and that of Saint Nicolas from the 13th century. It has manufactures of hosiery, and of linen and woollen for the same of the same of

Saint Nicolas from the 15th century. It has manufactures of hosiery, and of linen and woollen fabrics. Pop. (1901) 6,045.

Mamiani della Rovere, TERENZIO, COUNT (1799-1885), Italian poet, philosopher, and statesman, was born at Pesaro; took part in the revolutionary movements of 1831, and was ban-ished. He lived at Paris till 1846, and then became professor of philosophy at Turin. Subsequently he was several times minister under Cavour. In philosophy he was first an empiricist, and gradually became a Plato-One of his works appeared in English (Rights of Nations, trans. by R. Acton, 1850). In his youth he versified sacred legends in the *Inni Sacri* (1832), and dealt with nature and national themes in the *Idilli* (1836). All his works are inspired with the noblest patriotism. Mestica edited his Prosc. e Poesie Scelte (1886). See monographs by Gaspari (1888), Bianchi (1896), and Casini (2nd ed. 1896).

Mamilius, the name of a distinguished family at Tusculum in ancient Italy. After Tarquin's expulsion from Rome, Octavius Mamilius roused the Latins against the new republic, and was killed in the battle at Lake

Regillus in 498 B.C.

Mammals, the highest class of vertebrates, characterized is but scantily developed, and in the Cetacea it is functionally replaced by the layer of blubberor fat-beneath the skin; but in all cases it is present to some extent, if only during feetal life. In connection with the hair there is developed a system of skinglands, some of which are invariably modified to form the mammary glands. The two cavities of chest and abdomen are separated by a complete muscular partition, the diaphragm, which has much to do with the move-ments of respiration. The heart is four-chambered, and the single aortic arch curves to the left side, and not to the right as in birds; the lungs lie freely in the chest cavity, and are not bound down by membrane, as in birds;

the surface of the brain is usually well convoluted, and the brain shows a number of anatomical peculiarities. Similarly, the skeleton of a mammal can be distinguished from that of any other vertebrate by a number of characters. For example, in the skull there are two facets, or condyles, for articulation with the backbone; the lower jaw consists of but one bone at each side; there are three little bones in the middle ear; the sutures, or lines of junction of the bones of the skull, usually remain distinct throughout life; and in most cases teeth of characteristic complexity are present in both jaws. Again, in the neck there are, with rare exceptions, only seven vertebræ; a bone called the coracoid, very important in birds and reptiles, is, except in monotremes, absent from the shoulder girdle of mammals.

Mammals are typically terrestrial animals, furnished with four limbs. But a few have become fitted like birds for an aërial life—e.g. bats. Many have become aquatic, and here the whales mark the culminating point; similarly the mole shows the maximum adaptation to the fossorial life, and the monkey to the arboreal.

In classifying mammals, stress is laid in the first instance on the methods of reproduction. Mammals are in the general case distinguished from lower vertebrates by the fact that they give birth to living young, in place of lay-ing eggs; but three living man-mals lay eggs like birds and reptiles. It is, therefore, necessary to separate these mammals from all the rest, and form of them a separate sub-class, called Prototheria, or primitive mammals. Above this sub-class we come to the order of marsupials (e.g. kangaroo) in which the young are born alive, but in a very imper-fect state of development, and are placed after birth in a pouch by the mother. These constitute the sub-class Metatheria, or later mammals. Finally, all other mammals give rise to fully developed young, and are included in the sub-class Eutheria, or welldeveloped mammals. In the Prototheria the brain is usually smooth, and its details of anatomy are somewhat reptilian; the coracoid is as well developed as in a reptile; as in marsupials, there are epipubic bones on the abdominal wall; the mamma, present in all other mammals, are here absent, and the milk is secreted merely on a bare patch of skin, from which it is licked by the young. Associated with the egg-laying habit are certain peculiarities of the reproductive organs of the reptilian, and not of the characteristic mammalian

type. (See further ORNITHO-RHYNCHUS and ECHIDNA. In the marsupials, as in monotremes, two epipubic bones are present; but these have not, as is generally supposed, anything to do with the pouch. The brain is smaller and simpler than that of the higher mammals, and the reproductive organs are, generally speaking, intermediate between those of monotremes and those of the higher mammals. A point on which great stress was formerly laid in distinguishing between Metatheria and Eutheria is that, whereas in the latter the allantois unites with the uterine wall to form the complex structure known as the placenta, by means of which the unborn young are nourished during the prolonged period of gestation, in the marsupial the allantois remains small, and was formerly believed never to form a placenta. It has, however, been recently shown that in certain marsupials a true though small allantoic placenta does exist, and the general belief now is that the marsupials have been descended from ancestors which possessed a placenta like that of the Eutheria. The marsupials were once widely distributed over the globe, but are now confined to the Australian area, save for a few which are found in America. In the Eutheria the period of gestation is relatively long, the young are nourished before birth by the placenta, and their dependence on the mother's milk is less prolonged and less absolute than that of the marsupials. brain is well developed, the reproductive organs are highly differentiated; there are no epipubic bones; as in marsupials, the coracoids are represented merely by a process of the shoulder-blade. The mammalia may be classified as in the following table: Sub-class: 1. PROTOTHERIA.

Order Monotremata - example, ornithorhynchus. Sub-class: 2. METATHERIA. Order: Marsupialia — kangaroo.

Sub-class: 3. EUTHERIA. Orders—

(1) Edentata—sloth. (2) Sirenia—manatee. (3) Ungulata—horse.

4 Cetacea—whale. Rodentia—rabbit. Carnivora—tiger. Insectivora—mole. Chiroptera—bat. 9 Primates—monkey

The insectivora, usually placed high in the list on account of their affinities with the primates, show many indications of a descent from primitive forms. They seem to be related to marsupials, and it is probable that the primi-

tive insectivores arose from a marsupial stock. From the insectivores have arisen the bats, or chiroptera, and the primates. Again, though the existing carnivores, ungulates, and rodents are sharply separated from one another, these lines of demarcation are largely obliterated when the history of the orders is followed geologically. As we pass backwards, the members of all three orders approach more and more to the insectivore type, and they were probably all derived from an insectivore stock. Of the origin and relations of the remaining orders little is known.

It is perhaps now the general opinion that the monotremes are off the main line of descent—that is, that their immediate ancestors did not give rise to the other mammals. There can now be little doubt that Metatheria and Eutheria have had a common origin. But the nature of this ancestral stock—whether amphibian or reptilian—is still uncertain. The earliest known mammals are found in the Triassic beds.

It was the difficulties connected with the distribution of mammals that first directed Darwin along the line of thought which ended in the publication of the Origin of Species (1859). Such facts as the presence of marsupials in S. America and in Australia, but nowhere else, the presence of the tapir in S. America and in the region of the Malay, of lemurs in Africa and in India, but nowhere else, and many similar problems otherwise insoluble, become at once explicable if the theory there laid down be granted. Some problems of distribution still, however, remain obscure-e.g. the reason for the disappearance of the horse from S. America prior to the human period. (See further under Embryology.) See Mammals Living and Extinct, by Flower and Lydekker (1891); Mammalia, by F. G. Beddard (Cambridge Natural History, vol. x. 1902); and The Royal Natural History (1893 5) may be consulted for more popular accounts. For distribution, consult A Geographical History of Mammals, by R. Lydekker (1896); and see also article GEOGRAPHICAL DISTRIBUTION. For fossil forms, see yol. ii. of Nicholson and Lydekker's Manual of Palaontology (1889). For the development, see Hertwig's Text-book of the Embryology of Man and Mammals (trans. by Mark, 1892); Foster and Bal-four's Elements of Embryology (1883). In studying the skeleton, Flower's Osteology of the Mam-nuclia (3rd ed. 1885) will be found invaluable; while for British forms, see Lydekker's British Mammals (1895) and Bell's British Quadrupeds (2nd ed. 1874).

Mammea, a genus of tropical trees belonging to the order Guttiferæ. They bear indehiscent drupes, the best-known species, M. americana, the mammee tree, being especially valued for its fruit. The aromatic liqueur eau de Créole is distilled from the flowers of this species. The flowers are white and fragrant, and are borne in summer. Mammeas may be cultivated in stove heat, if given a light fibrous loam containing a moderate proportion of leaf-mould.

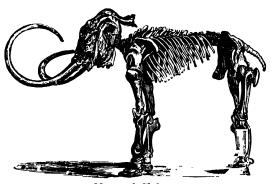
Mammillaria, a genus of tropical succulent plants belonging to the order Cactaceæ. They bear usually solitary flowers growing from the axil of the tubercle. The plants average about six inches in height, the stems being cylindrical or globular, and the plants absolutely symmetrical in form. They generally bear spines in neat rosettes. Mammillarias are not difficult to grow under glass if plenty of light and moderate heat be af-

than ten feet long. In the south of Europe the mammoth was contemporaneous with cave man, and rude but spirited sketches of it have been found engraved on ivory. See Sir Henry Howorth's The Mammoth and the Flood (1887), and Dr. Leith Adams's British Fossil Elephants (Palæontographical Society; 1859).

ontographical Society; 1809).

Mammoth Cave, largest known cave in the world, Edmonson co., Kentucky, U.S.A., between Nashville and Louisville. The largest chamber, known as Chief City, is 450 ft. long, 130 ft. wide, and 50 ft. high. Cleveland's Avenue is more than two miles long. Its Echo River communicates by an underground passage with Green R. The animal life is confined to a few species of crayfish, insects, and bats. The cave was discovered in 1809 by a hunter named Hutchins. See Hovey's Celebrated American Caverns (1882).

Mammoth Hot Springs. See YELLOWSTONE NATIONAL PARK.



Mammoth Skeleton.

forded. They require a soil composed of sandy loam, finely-broken bricks, and lime rubbish.

Mammoth (Elephas antiquus), an extinct fossil elephant. differs little in anatomical structure from existing members of the same genus, and, like them, was a large animal with a height of from nine to eleven feet. But it had a thick covering of darkbrown hair, and is known to have fed on the shoots of coniferous trees. Great numbers of mammoth skeletons have been unearthed in Europe, but chiefly in N. Siberia and on the Arctic coasts, where they have been preserved in the frozen soil. One seen by Adams in 1846 was so well preserved that its flesh was eaten by the natives, by their dogs, and by wild animals. Its stomach was opened, and was found to be filled with fine vegetable shoots. The tusks of the mammoth are sometimes more

Mammoth Tree. See SE-QUOIA.

Mamore, riv., Bolivia, S. America, generally considered as the head-stream of the Madeira. See AMAZONS and PERU.

Man is zoologically a member of the order Primates, and is most nearly related to the anthropoid apes (family Simiidæ). The distinguishing features which justify the erection for him of a separate family-Hominida-are chiefly the following. The braincase and brain are proportionately much larger than in any anthropoid, while the facial portion of the skull is reduced in size, and is placed at a different angle to the brain-case, being below instead of in front of it. In the male sex in the European races the brain has an average weight of 1,360 grammes, while in the anthropoids the average weight is stated to be only 360 grammes. In man the teeth

form a regular, uninterrupted, horseshoe-shaped series, the canines being small in both sexes, and not protruding. In connection with the upright position the skeleton shows a number of minor peculiarities: thus, the vertebral column presents a char-acteristic sigmoid flexure, only indicated in the apes; the lower limbs are proportionately much longer; the great toe is long and strong, and in the adult is incapable of being opposed to the other toes. Again, the heel is better developed than in any an-thropoid, and the foot has been so modified that it can be placed flat upon the ground. We may say concisely that, from the zoological standpoint, man differs from the anthropoids in (1) his adaptation to the erect position and the terrestrial habitat, in (2) his greater brain develop-ment, and in (3) the very fully developed social instinct. To the zoologist there can be no reasonable doubt that he has arisen from an anthropoid stock of (mainly) arboreal habitat.

Although after infancy the up-

right position is the one habit-ually adopted by man, yet it is a position which he can only maintain for a relatively short period without fatigue. This seems inexplicable, save on the assumption that the position is a recent acquisition. Another interesting point is the presence of a separate tibia and fibula in the lower limb. The persistence of so primitive and apparently so useless a structure as a free fibula can only be explained on the supposition that it is an inheritance from an arboreal ancestor, to whom the free movement of the ankle-joint rendered possible by its presence was a necessity in climbing. The well-developed clavicles and some associated peculiarities of the scapula can, similarly, only be explained on the assumption that man is descended from a climbing ancestor. The reduc-tion in number of the offspring to one (or two) at birth, and the corresponding reduction of the mammæ and their thoracic position, are likewise heritages from the arboreal ancestor; for the thoracic position is the one in which a climbing organism can most easily carry her young without loss of equilibrium, and in such an organism the reduction in the number of young produced at a birth is a necessary condition of persistence. Despite the apparent utter helplessness of the human infant at birth, it has been shown to possess the same tenacity of grip as the young anthropoid ape, which is capable of clinging to the long hair found on the chest and abdomen of the mother. There are indeed many

indications of close affinity with the anthropoid ape both in the human fœtus before birth and in the infant at birth. Thus, the sole of the foot at birth is inturned, the vertebral column does not then display the characteristic curves, the foot possesses a power of prehension of which the later condition affords no trace,

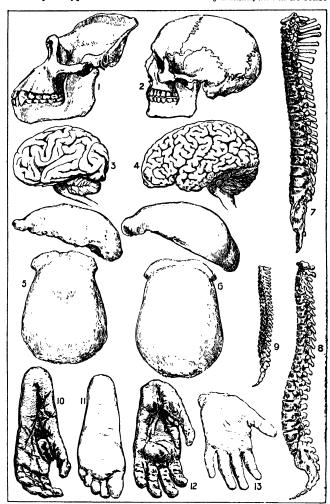
and so on.

In his five fingers and five toes, in his separate radius and ulna and tibia and fibula, in his clavicles, in the structure of his teeth, man is primitive in structure-still shows relation to the insectivore stock from which he is lineally developed. It is possible that the common ancestor of man and the large anthropoids was a form related to the living gibbons, but as yet there is no fossil evidence of the existence of such a form, and we have practically no knowledge of the pre-human ancestors of man. The recent discovery by Dubois in Java of a portion of a skull and a femur, believed to belong to a hitherto unknown form to which he gave the name of Pithecanthropus erectus, has as yet done little to bridge the gap in man's ancestry. In the absence of evidence of a direct kind, we can only reason from analogy as to the probable course of evo-lution. There have been many discussions as to which of the three distinctively human characters led the way. Some anthropologists emphasize the creet position as the important point, for this liberated the hands and made them the fit instruments of the developing brain. On the other hand, Professor Ranke suggests that it was the developing brain that made the upright position necessary, for it is the only attitude in which the head, made heavy by the increasing size of the brain, could be balanced on the vertebral column. If allowed to fall forward, the head would have hindered free respiration. Still other authorities, again, believe that it was the development of the social instinct which made for progress; for this, by protecting the young and weak, must have greatly accelerated variation. Anyway, it is the social instinct which has played the predominant part.

As to the date of origin of man nothing definite can be said. The first clear indications of his existence anywhere on the earth are found in the deposits of the Glacial Period. More than this: the remains found in beds of Glacial age in Europe (bones, tools, etc.), in Asia (tools, but not bones), in America (tools, bones), and in Africa (tools), all indicate a race at approximately the same stage of civilization, if it

may be so called. Much indirect evidence points to the Tertiary period, possibly the Miocene, as that of the origin of man, for in the strata of that era some geologists claim to have discovered traces of his existence. It was certainly in Upper Miocene times

is believed to be the Neanderthal or Spy type, which shows a number of pithecoid characters, the forehead being low and retreating, the brow ridges prominent, and the stature apparently short: nevertheless the Spy man was definitely human, and in no sense



Man and Gorilla compared.

Skull of gorilla.
 Skull of man.
 Brain of gorilla.
 Brain of man.
 Skull of Pithevanthropus erectus, side and top view.
 Neanderthal skull, side and top view.
 Vertebral column of gorilla.
 Vertebral column of corilla.
 Foot of man.
 Hand of gorilla.
 Hand of man.

that the anthropoid stock began to undergo differentiation

The men of the Glacial Period fall into two groups, according as their implements are rough and unpolished (Palæolithic type) or smooth and polished (Neo-lithic type). Of the Palæolithic skulls found in Europe, the oldest

a transitional form. In the development of man the social instinct, or more exactly the characteristic tendency to form social groups, must have had a double effect: in the first place, it must have accelerated variation; and in the second place, it must have tended to fix advantageous variations. As the variations which made for progress were less a matter of gross structural change than of brain development, and a wise utilization of experience, they became, as it were, the common property of the group, and tended to become more and more firmly fixed by the group life, in proportion as they gave the group an advantage in the struggle for existence. In the early stages it was the struggle with the physical and animal environment that was the dominant factor. Later, as Professor Karl Pearson points out, it was the struggle between rival groups which led to evolu-tion. Man's supremacy over his non - human environment was, thanks to the solidarity of the group, secured at an early stage, and it was the pressure of surrounding groups which made for progress. Where, as in the case of the Australians and Tasmanians, a group has been isolated, there it may have remained for generations apparently stationary. But in such a case contact at a late stage with a much more highly specialized group leads, not to progress, but merely to elimination, as has already happened in the case of the Tasmanians.

As regards the races of men. there has been much discussion as to whether or not all are to be regarded as forming one species. The view that there is but one species is supported by the fact that the progeny of mixed marriages show no obvious diminution of fertility, as witness the numerous races of half-castes found in different parts of the globe. On the other hand, mixed unions of this type are only known between Europeans and native races, and there is virtually no evidence as to the fertility of the offspring of a union between individuals of two distinct non-European races - e.g. Hottentots and Malays. Nor can it even be said that the results of cross-breeding between Europeans and natives have been studied with scientific care.

As regards stature, the limits of normal variation appear to be from 135 metre to 190 metre, the average being about 165 metre (5 ft. 6 in.); but this average is obtained by leaving out of account exceptional cases, such as the Negroid Akka, whose stature is only 4 ft. 6 in., and it is, further, based on figures for males only. The difference in height between the two sexes varies from 3 in. to 5 in., the average being about 5 in.

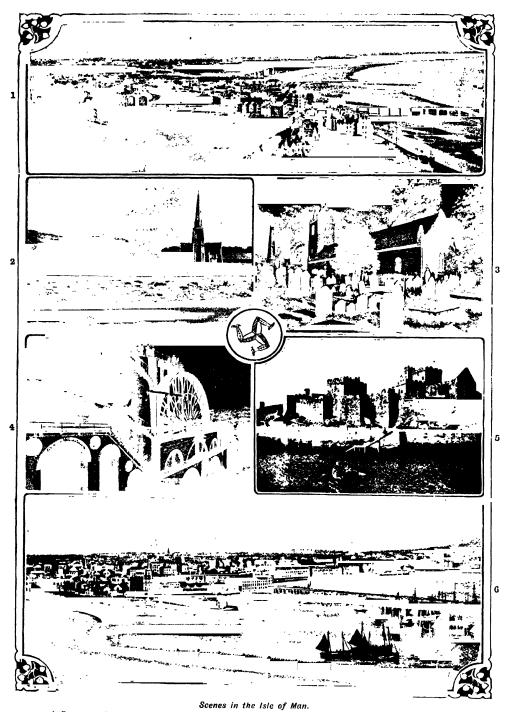
The degree of pigmentation of skin, hair, and iris, when taken in conjunction with the characters of the hair, is of great importance in classification. Broca recognitions

nizes no fewer than thirty-four shades of colour in the human skin, but it may be sufficient here to point out that these are all variants of the following four colours — white, yellow, brown, black (or dark-skinned). As regards the iris, the blue or gray eyes found in fair-skinned Europeans are the rarest shades, all other peoples having dark eyes. The chief types of hair are the straight (e.g. that of Chinese), the wavy (common in Europeans), the frizzy (Australians), and the woolly (as in negroes). Other very important characters in classification are the shape of the skull and the form of the bones. In the article ETHNOLOGY will be found a summary classification of the races of man, based upon the above and some other characters.

Apart from the physical characters of man discussed above, there are certain universal social characteristics which must be mentioned. One of these is the love of ornament. Paradoxical as the statement may seem, it appears to be a well-established fact that ornament precedes dress, which is indeed derived from articles of adornment. Though some races go entirely unclothed, it is doubtful whether any are totally devoid of personal ornaments. Again, there is much evidence to show that all ornaments were originally of the nature of amulets or charms. Another widespread if not universal characteristic of man is the habit of domesticating animals. The earliest animal to be domesticated seems to have been the dog, which was tamed by Neolithic man, as it is also by the very primitive Australians. By the aid of his dogs primitive man is a hunter, but when to the dog are added domesticated ungulates—such as cattle, goats, the ass, and so forth—agriculture becomes possible. It is often said that there are three great stages in culture, man being first hunter; then, as he learns to domesticate ungulates, he becomes a nomad, following the natural migrations of his flocks; finally, with the use of draught animals, he becomes agriculturist, learning to fertilize the soil artificially. But this statement, as has been pointed out, is only partially true; for even the primitive Australians add to the spoils of the hunt fruit and roots collected by the women, whose digging sticks' are the prototypes of the hoe of civilization, and who display some acquaintance with the conditions of plant growth. From this stage it is but a step to the conditions found among the natives of Chota Nagpur in India, where the men hunt, while the women cultivate clearings in the forest, which are abandoned for fresh ones as soon as the soil is exhausted. It is probably from a condition like this that divergence took place in the two directions of pastoral life and agriculture in the strict sense.

Man, ISLE OF, in the Irish Sea, is 33 m. in length and 10 m. in breadth. High, rugged cliffs border the coast, pierced in several places by caves. A double or triple range of hills stretches south-westward through the island (Snaefell, 2,030 ft.). Nearly two-thirds of the surface is under cultivation. Argentiferous lead is worked. The climate is remarkably equable, the annual range of temperature being only 171, as compared with 235 at Brighton. Myrtles, fuchsias, and other exotics flourish out of doors all the year round. There is a breed of tailless cats. The island is a much-frequented holi-day resort. The principal towns are Douglas (the seat of government), Ramsey, Castletown (the ancient capital), and Peel. Near St. John's is Tynwald Hill, formerly the seat of the Supreme Court. The island is rich in stone circles, sepulchral nounds, nunic and other crosses; possesses Rushen Castle, a well-preserved mediaval fortress, and Peel Castle. It was known to the Romans as Mona, and repeatedly raided by Norsemen. In 1266 Scottish supremacy replaced Norwe-gian, but in 1290 the islanders placed themselves under English influence. In 1406 Sir John Stanley was granted the island, with the title of king. In 1765 the Duke and Duchess of Athole, who then held the island, agreed to alicnate the sovereignty to the British crown for £70,000 and an annuity of £2,000. Their remaining claims were ceded in 1829 for a further sum of £416,000. The administration is vested in a lieutenant-governor representing the King, a council, and the elected House of Keys (twenty-four members). The episcopal designation is Sodor (Norse, Sudreyr = 'Southern') and Man. The Manx language, now almost extinct, is a dialect of the Celtic. Public a dialect of the Ceitic. Public revenue (1903-4), £85,535; ex-penditure, £74,187; public debt, £255,352. Area, 227 sq. m. Pop. (1901) 54,758. See A. W. Moote's A History of the Isle of Man (2 vols. 1900), The Constitution of the Isle of Man (1882), Hall Caine's The Little Man Island (1894), The Deemster (1887), The Manxman (1894), and W. T. Radcliffe's Ellan Vannin (1895).

Manaar. See Manar. Manacor, tm., Majorca, Balearic Is., Spain, 30 m. by rail E. of Palma; contains a palace of the



1. Rainsey. 2. Tynwald Hill and St. John's Church. 3. Kulk Braddan. 4. Laxey Wheel, 5. Peel Castle. 6. Douglas VII.—9

ancient kings of Majorca, and is a bishop's see. Wine is exported. a bishop's see. W Pop. (1900) 12,408.

Managua. (1.) Lake in Nicaragua, Central America, 30 m. long by 16 m. wide, with an area of 438 sq. m., and is drained into the Lake of Nicaragua (28 ft. lower), 4 m. distant. Steamers ply on it. (2.) City, s. of the above lake, cap. of republic of Nicaragua since 1851. Pop. 30,000. Manahiki. See MANIHIKI. Manakin, the name given to a family (Pipridæ) of passerine

birds, which range from Mexico to Brazil and the Argentine. They are mostly small, thick-set birds, inhabiting forests, where they flit about the branches after the fashion of tits. Their diet consists of fruit and seeds, mingled

arated by the islands of Manar and Rameswaram and the reef known as Adam's Bridge. The gulf is famous for its pearl fish-

Manasarowar (Tibetan, Tso-mapham), sacred lake of S.W. Tibet, 15,285 ft. above sea-level, in the valley of the Brahmaputra, in 812 E. long. Its area is over 150 sq. m. To the N.W. is the sacred mountain of Kailas.

Manasseh, the elder son of Joseph, who, however, received from his father a blessing in-ferior to that of his brother Ephraim (Gen. 48). The tribe of Manassch had settlements on both sides of the Jordan.

Manasseh ben Israel (1604theologian and Jewish scholar, born in Lisbon; founded

Point of Ayre Maughold IId GLM. **54** 15 IRISHSEA English Miles

Isle of Man.

with insects. Examples are Pipra relutina, which is black with a blue cap; and Ceratopipra cornuta, which is black, with scarlet head, neck, and thighs. There are in all some seventy species.

Manaoag, tn., prov. Pangasinan, Luzon, Philippines, 16 m. E. of Lingayen. Pop. 17,500.

Manaos, cap., prov. Amazonas, Brazil, near confluence of Rio Negro with Amazons. Indiarubber, Brazil nuts, copaiva oil, and cocoa are exported. Pop.

Manar, or MANAAR, GULF OF, inlet of Indian Ocean between Ceylon and India, nearly 150 m. wide. It narrows to the N. into Palk Strait, from which it is sepa Hebrew printing press at Amsterdam (1626). He sought to gain admission for the Jews into England in the time of Cromwell (1655). Manasseh published Spes Israelis (1650), Vindicia Judaorum (1656), and De Creatione (1635). See Kayserling's Menasse ben Israel (1861).

Manatee (Manatus), one of the sea-cows or sirenians. It occurs on both sides of the Atlantic, never voluntarily leaving the water, and never going far from the shore. Like the dugongs, manatees are purely vegetarian in diet. A full-grown manatee is about eight feet long, and has a somewhat fishlike body, with a broad, flattened tail, a blunt

muzzle, with a very mobile upper lip, minute eyes, and a finely wrinkled skin, covered with very delicate hairs. The fore limbs



Manatec.

form paddles, as in the dugong, but except in one species, they bear three minute nails near their extremities. There is very free movement at shoulder, elbow, and wrist. The special peculiarity of the manatee is found in the cleft upper lip, the parts of which have been compared in their manner of action to the mandibles of a caterpillar. Other peculiarities are the presence of only six vertebræ in the neck, the rudimentary nature of the incisor teeth, and the numerous (eleven) cheek teeth, which have square crowns with transverse ridges. Only about six of these teeth are in use at one time, and they are moved forward and shed when worn, much as in the elephant. Manatees are hunted for their oil and hides. They are

their oil and fides. They are easily tamed. Only one young one is born at a time.

Manbhum, dist., Chota Nagpur, div. of Bengal, India, with an area of 4,147 sq. m., and a population (1901) of 1,301,364. Coal is mined. The capital is Purulia.

Manby, Gronger William

Manby, George William (1765-1854), English inventor, born at Denver, Norfolk. He invented a life-saving apparatus for shipwrecks, tried at Yar-mouth (1808), for which he re-ceived grants from Parliament. He also gave his attention to lifeboats, and to life-saving apparatus for fires and for ice accidents.

Mancha, LA, dist. s. of New Castile, Spain, now included in provs. of Albacete and Ciudad It produces a light red wine called Val de Penas, and is noted for its mules. Don Quixote and Sancho Panza belonged to this district.

Manche, maritime dep., N.W. France. The N.E. coast is low, and the w. shore inhospitable, the only harbour being Granville. Around the Bay of St. Michel, to the s. of Granville, is a marshy tract. The peninsula of Cotentin forms the N. part of the department. To the N. is the deep bay of Cherbourg. Hemp, fruit, betroot, and cereals are cultivated. Cider is manufactured. Area, 2,289 sq. m. Pop. (1901) 491,372. Cap. St. Lô. Manchester, par, and munic, bor, city (lord mayor since 1893), co. bor., the seat of a bishopric since 1847, and of a university since 1880, in Lancashire, England, 183 m. N.w. of London. It has access for sea-going vessels by means of the Manchester Ship Canal, opened in 1894. Manchester is essentially a modern town. It is chiefly engaged in the spinning and weaving of cotton, and in the bleaching, printing, and making up of 'Manchester goods' There are also a vast number of engineering works. The shipping houses of Manchester export cottons, silk and woollen goods, steam, gas, and electrical machinery, chemicals, india-rubber, iron, steel, and copper goods

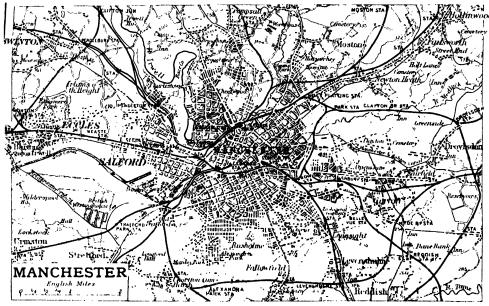
of technology, school of art, the Manchester grammar school (founded in 1515), the Hulme grammar school, and the Manchester high school for girls. The art gallery contains a noteworthy collection of pictures. The town hall (1877) is one of the finest in the kingdom, and contains decorated panels by Madox Brown. The Free Trade Mall was erected on the site of the Peterloo massacre in 1856, to commemorate the victory of the Anti-Corn Law League; it is here the Hallé concerts are given. The city returns six members to the House of Commons. Pop. (1901) 543,969.

MANCHESTER COLLEGE was founded in Manchester in 1786,

It manufactures cotton cloth, fire-engines, locomotives, paper, and woollen goods. It is the seat of St. Anselm's College. Pop. (1900) 56,987. (3.) City, Virginia, U.S.A., at the falls of James R., opposite Richmond. It has coalmining. Pop. (1900) 9,715.

Manchester, Edward Montagu, SECOND EARL OF (1602 71). When the girll war broke out

Manchester, EDWARD MON-TAGU, SECOND EARL OF (1602 71). When the civil war broke out he was given command of the troops in the eastern counties, and gained the battles of Marston Moor and Newbury; but showing great slackness in following up victories, he was by Cromwell's influence removed from the command. He strongly opposed the trial of the king and the establishment of the common-



Armholmura Films

to the value of £13,609,862 in 1905. In the same year the imports were valued at £23,290,796. The water supply of Manchester is derived from Lake Thirlmere in Cumberland. Few English towns are better supplied with public parks, the latest acquisition being Heaton Park, 693 acres in extent. Manchester was the first town in England to adopt the Free Libraries Act. The Chetham Library was founded in 1653 by Humphrey Chetham. Mention should also be made of the Christie Library at Owens College, and of the John Rylands Library, which includes the Althorp Library. The city possesses an excellent school

and removed to Oxford in 1893. It exists for the purpose of promoting the study of philosophy, theology, and religion, without insisting upon the adoption of particular doctrines, and all members of Oxford University may attend the lectures without fees. See Axon's Annals of Manchester (1886), Saintsbury's Manchester (1887), and Shaw's Manchester, Old and New (1896).

Manchester. (1.) Town, Hartford co., Connecticut, U.S.A., 8 m. E. of Hartford; manufactures paper, woollens, silk, cotton, and needles. Pop. (1900) 10,601. (2.) City, New Hampshire, U.S.A., co. seat of Hillsboro co., on the Merrimack, 15 m. s. of Concord.

wealth, and took an active part in the restoration of Charles II.

Manchester Quardian, The, was established in 1821 as a weekly newspaper by John Edward Taylor, the agitation which sprang up after the Peterloo massacres being his inspiring motive. It was edited for many years by Jeremiah Garnett, and Archibald Prentice was one of the principal writers on political subjects. Cobden also advocated in the Courdian his anti-corn law theories. In 1855, the date of the repeal of the newspaper stamp, the Guardian first appeared as a daily newspaper. Its price was at first twopence, but that was speedily changed to a penny. In

1872 Mr. C. P. Scott became editor, and later partner with his cousin John Edward Taylor, second son of the founder. Mr.

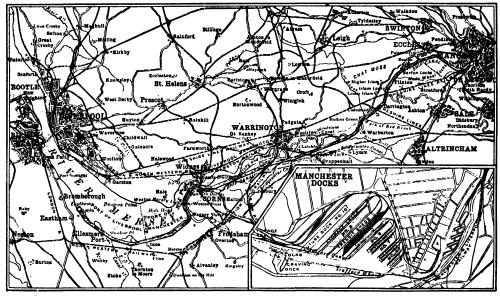
Taylor died in 1905.

Manchester Ship Canal. This canal was begun in 1887, and was opened for traffic on Jan. 1, 1894. It starts from Eastham, on the left bank of the Mersey estuary, about four miles above Birkenhead. At the entrance there are three parallel locks of different sizes, and when the water of the Mersey is at the same level as the water in the canal the lock gates stand open. For the first fifteen miles from Eastham to Runcorn the canal skirts the Mersey, from which it is separated by a massive sea-wall. At Runcorn tleaves

opened the new dock (No. 9) at Manchester, the area of which is 154 acres, and the depth 28 ft. For the half-year to June 1905 the available profit amounted to £102.970.

Machineel, a tropical tree, Hippomane Mancinella, belonging to the order Euphorbiacie, which yields a poisonous milky juice. It bears small flowers in May, followed by glossy, yellowish-green berries. It is easily grown in a peaty soil in stove temperature.

Manchuria, country lying N.E. of China proper. Area, 363,000 sq. m., divided into three provinces: (1) Feng-tien, or Hsing-Ching, in the s.—cap. Mukden (Manchu name), or ShênIn Mukden the lowest reading in winter is about -28°, and the highest in summer about 96°. From December till the end of March the country is ice-bound. Heavy rains occur during July and August, which make traffic impossible, except by river. The soil is very rich. The most important cereal is tall millet, the staple food of the pensantry. Other crops are barley and wheat, rice, buck-wheat, beans (from which come bean-cake and hean-oil—the chief exports of the country), hemp, opium, tobacco, ginseng, potatoes, cabbage, melous, grapes, and hardy fruit. Silks, furs, skins, and pigs' bristles are among the most valuable animal products. It was originally the home of the

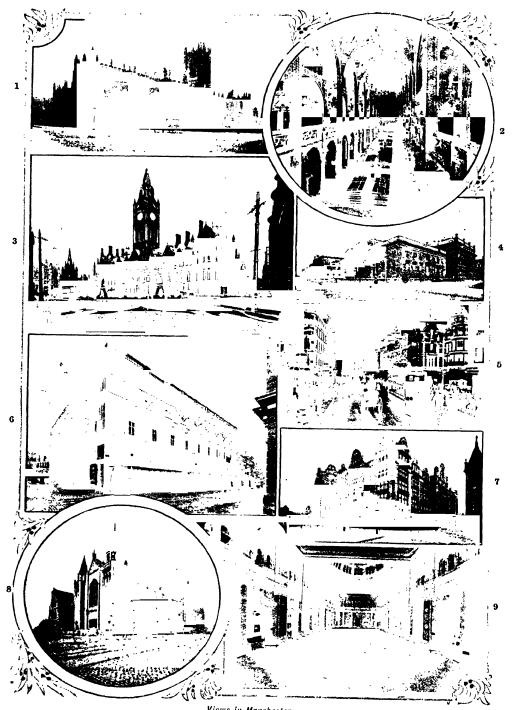


Manchester Ship Canal.

the estuary and strikes up the valley of the Irwell. The next locks are at Latchford, eight miles farther up; and between that and Manchester are three sets of locks, in all giving a total rise above sea-level of about 72 ft. The canal has a breadth of 172 ft. at surface and 120 ft. at bottom, and a depth of 26 ft., which is now being increased to 28 ft. The engineering difficulties were great. Railway lines had to be diverted and their levels changed, rivers carried under the canal by means of inverted siphons, and the Bridgewater Canal carried over the ship canal by means of a large swing aqueduct. There is extensive dock accommodation at Manchester, Salford, Warrington, and elsewhere. In July 1905 the King

Yang (Chinese name; (2) Kirin—cap. Kirin, or Chuen-chang; and (3) Hei-lung-chiang, in the N.—cap. Tsitsihar. The province of Feng-tien is divided by a range of hills starting in the s. of the Liao-tung peninsula and running N.E. to Kirin. It is well watered by the Liao, Hun, and Tai-tzu rivers, all navigable by junk in summer. At Yentai, 10 m. N.E. of Liao-yang, coal is mined. Kirin, the central province, is crossed by the Sungari, Hurka, and Ussuri rivers. The mountain ranges on the w. (the Great and Little Khingan) are mostly volcanic. Agriculture is confined to the river valleys, especially those of the Nonni and Hulan. Gold is found in the N.W. The climate of Manchuria is extreme.

Manchus; at the present time ninety per cent. of the population are Chinese immigrants. Manchuria was occupied by the Russians at the time of the Boxer outbreak (1900), and though it should have been evacuated under the terms of the Manchurian Convention (April 2, 1902), it remained under Russian control. This was the cause of the Russo-Japanese war, which ended in the Russian evacuation of the country. (See Russo-Japanese War.) Prior to the Russian occupation. Port Arthur was China's greatest naval station in the N. The chief manufactures are bean-cake and bean-oil, silk, vermicelli, indigo, and sam-shu (a native spirit). The exports through Newchwang amounted in 1905 to £1,844,731,



Victus in Manchester.

1 Cathedral. 2. Rylands Library, interior. 3. Town Hall. 4. Art Galley and Athenaum. 5. Market Street. 6. Fit 7. Technical School. 8. Whitworth Hall and Owens College (Victoria University). 9. Royal Exchange, (Photos by R. Bunks.)

and the imports to £7,514,074. There are three main lines of railway: (1) The Chinese Eastern Ry.—a continuation of the Russian Transsiberian Ry. from Port Arthur to Kharbin (600 m.), thence w. to Transbaikalia (1,200 m.), and E. to Vladivostok (600 m.); (2) the Imperial Chinese Ry.—a

sion, by Mrs. Duncan M'Laren (1896).

Mancini, Pasquale Stanislao (1817-88), Italian jurist and statesman, born at Castel Baronia (Avellino). As minister of justice, in 1876 he promoted the freedom of the press, the repeal of imprisonment for debt, and the the ancient Gnostics. They occupy a portion of Mesopotamia, and although their language is either Arabic or Persian, their scriptures are written in an Aramaic dialect. The principal of these is the Sidra Rabba, or 'The Great-Book,' in which are related three total destructions of the human race by fire and water, pestilence and sword, only two persons in each case surviving. The great god of the Mandacans is 'Primal Life,' from whom emanate the 'Second Life,' and the 'Messenger of Life,' the Christ of the Mandacans.

Mandalay, cap. of Upper Burma, on l. lok. of Irawadi, 400 m. N. of Rangoon. The original town is a square encompassed by a wall. Its gates are surmounted by curious wooden towers, and in the centre of the town is the picturesque palace of former kings of Burma. It has a famous pagoda containing an image of Budha that attracts thousands of pilgrims. Silk-weaving is the chief industry. Pop. (1901) 166, 154.

industry. Pop. (1901) 166,154.

Mandamus. This is a prerogative writ granted by the King's Bench Division of the High Court to enforce the performance of a legal duty when there is no other remedy. It is generally addressed to public bodies or courts of inferior jurisdiction. A mandamus nisi is first issued, ordering the party to show cause why the mandamus should not be made absolute. See Shortt and Mellor's Practice on the Crown Side (1890), and Shortt's Information, Mandamus, and Prohibitions (1887).

Mandarin, a Chinese government official, civil or military. The rank is indicated by the colour of the buttons on the cap. Those of the two highest orders (governors and generals) display buttons of red coral; the third order (lieutenant-governors, provincial judges, etc.), clear blue: the fourth order (prefects), lapis lazuli; the fifth order, crystal; the sixth order, white; and the seventh, eighth, and ninth orders, gilt or vellow buttons. The robes of civil authorities are embroidered with birds, and those of military authorities with beasts. Admission to mandarin rank, and promotion therein, are regulated by state examination.

Mandarin Duck (Anas galericulata), a handsome bird found in E. Asia, which possesses a neck-ruff of chestnut feathers, a curious 'fan' or 'sail' of chestnut and black feathers, and a brightly tinted crest. The female is soberly coloured.

Mandarin Orange (Citrus nobibis), a species of orange, with smaller fruit than most other species, which has long been prized in China. It has a distinct subtle flayour.



continuation of the Shan-haikuan line to the w. of Mukden; and a military railway from Mukden to An-tung on the Ya-lu (187 m.), and so with the Korean system. Pop. 17 to 20 millions. Set The Long White Mountain, by James (1888); Manchuria: Its People, Resources, and Recent History, by Alexander Hosic (1901); The Story of the Manchuria Mis-

abolition of ecclesiastical tithes. As foreign secretary (1881) he negotiated the Triple Alliance, and inaugurated Italian colonial policy by the expedition to Massowah.

Mandæans, or Sabians, an Oriental sect whose religion is compounded of Christian, heathen, and Jewish elements, somewhat resembling the worship of



1. Gateway, Kirin. 2. Town of Kirin. 3. Tallenwan Ray. 4. Tsitsthar. 5. Triumphal Arches, Tsitsihar. 6. Dalny; in the foreground a principle Chinese Merchant decorated by the Russian Government. (Photo by the Keystone View Co.) 7. Manchurian Belles, Kharbin. 8. On the Amur River. 6. Near Lino yang.

Mandate. In Roman and Scots law a mandate is a contract by which one person obliges himself to do some act for another person or to manage his affairs gratuitously. A reward may, however, be given in the form of a honorarium. The mandatary must use reasonable diligence, such as he would employ in his own affairs. See Green's Law Encyclopædia, vol. viii. (1898).

Mandaue, tn., C bu, Philippines, on E. coast, 4 m. N.E. of Cebu. Pop. 15,000.

Mandevilla, a genus of tropical climbing shrubs, belonging to the order Apocynacea. They bear simple racemes of mostly red or yellow, funnel-shaped flowers.
The only species cultivated in
Britain is M. starcolens, with white flowers. It likes plenty of root-room and a fairly rich fibrous loam containing peat.

Mandeville, EARLS OF ESSEX.

See Essex.

Mandeville, BERNARD DE (?1670-1733), Dutch ethical writer, was a native of Dordrecht; settled in London about 1692, and practised medicine there until his death. He is the author of The Fable of the Bees (1714), a professedly ethical work, which in reality was a jeu d'esprit founded on the paradox that 'private vices are public benefits,' and that a nation's prosperity is advanced by individual greed and luxury. It is partly in verse, partly in prose, and combined, in the 1714 edition, The Grumbling Hive (1705), Remarks on this, and An Inquiry into the Origin of Moral Virtue (1714). In a later edition (1723) he added A Scarch into the Origin of Society.

Mandeville, SIR JOHN, the accredited name of the author of a notable book of travels, published in French during the latter half of the 14th century. The real author is supposed to have been one Jean de Burgoyne, who died in Liège (1372), where he settled (1343) as a physician, being also astrologer, naturalist, and philosopher. The greater and philosopher. The greater part of the book is borrowed from the Epistle of Prester John, the works of Friar Odoric, Vincent de Beauvais, Friar Carpini, and others. There is an edition by G. F. Warner (1889), and Life by Cordier (1891).

Mandi, feudatory state, Punjab, India. Area, 1,131 sq. m. Pop. (1901) 174,045. Mandi, the chief town, is on the Beas, 45 m. N.w. of Simla. Pop. (1901)

Mandible, a term used to designate the lower jaw of vertebrates, and also the toothlike appendages of the mouth in insects, crustaceans, and allied animals.

Mandingans, African people, in W. Sudan, where they form the bulk of the population between the Upper Niger and the Atlantic. Some, such as the Veis of the scaboard, are pure negroes and pagans; but the great majority are a blend of negro, Berber, and Arab elements. These have long been semi-civilized Mohammedans, who founded the powerful mediaval empires of Mali and Guine, and the more recent kingdoms of Massina, Bambara, and Kong. All speak dialects of the Mande stock language. Total population esti-mated at over 10,000,000.

Mandla, chief tn., dist. of same mane, central Provinces, India, on Narbada R., 30 m. s.w. of Mhow. Area of dist., 5,056 sq. m. Pop. (1901)—tn., 5,428; dist., 317,250. name, Central Provinces, India,

Mandogarh, or MANDU, tn., now descrited, in Dhar state, Central India, ancient cap. of the Mohammedan kingdom of Malwa; was founded about 313 A.D. Among its ruins is the great mosque, one of the finest specimens of Afghan architecture in India.



Mandoline.

Mandoline, a musical stringed instrument which may be termed a small form of lute. The variety a small form of lute. The variety best known is the Neapolitan, which has eight strings tuned in four pairs of unisons to the same fifths as the violin, and set in vibration by means of a plectrum. The compass of the instrument is about three octaves.

Mandrake, or Mandragora, a genus of hardy herbaceous plants, natives of S. Europe. They bear small pale-coloured flowers, followed by globose, apple-like fruits. They have thick roots, and generally sinuate-margined leaves. M. vernulis, or devil's apple, bears its leaves in early spring, and its flowers soon after. M. autumnalis is supposed to be the mandrake referred to in Genesis in connection with Leah and Rachel. It bears its wrinkled bristly leaves in autumn, and soon afterwards its violet-coloured flowers, much like those of the passion flower. The mandrakes are easily grown in any deep, light soil, not too fully

exposed to sunshine. From very early times the mandrake has been superstitiously invested with all kinds of evil powers.

Mandrel, an iron rod used as a core round which something may be bent cylindrically -e.g. the revolving shaft which carries

the chuck of a lathe.

Mandrill (Cynocephalus mormon), one of the largest of the baboons, and a native of the west coast of Africa. The canine teeth are of enormous size; the cheeks are naked, and striped with brilliant colours; while the ischial callosities are of great size and bright red colour.

Mandsaur, or Mandesur, tn., native state of Gwalier, Central India, 106 m. N.W. of Indore. The treaty which concluded the Maratha-Pindari war was signed

here in 1818. It has a trade in opium. Pop. (1901) 20,936.

Manduria, tn., prov. Lecce, Apulia, Italy, 22 m. s.e. of Taranto; has a celebrated well. Pop.

(1901) 13,190,

Mandi, seapt. on the 8, of peninsula of Cutch, India, 36 m. s.w. of Bhuj. Pop. (1901) 24,683.

Manes, the name given to the spirits of the dead by the ancient

Romans. See LARES. Manet, EDOUARD (1832 - 83), French realistic painter, whose study of the quiver of light on objects in the open air paved the way for the later impressionists. He was born at Paris, and studied under Courbet, concerned solely with 'the veritable art of the thing seen.' The novel, realistic treatment of his Olympia (in the Luxembourg, Paris), which reveals his endeavour to give purity of outline, awoke bitter hostility. His influence was deep and lasting on the development of French art. See monographs, in French, by Bazire (1884) and Duret (1902), and, in German, by Von Tschudi (1902) and Meier-Gräfe (ed. 1904).

Manetho, an Egyptian priest and historian, who flourished in the third century B.C. He wrote in Greek on the religion and theology of the Egyptians, and on their history; only fragments ex-ist. Best edition by Unger, in Chronologie des Manetho (1867).

Manettia, a genus of tropical, evergreen, climbing plants be-longing to the order Rubiacere. They bear white, red, or blue infundibuliform flowers, and are useful plants for greenhouse pillars or trellises.

Manfred (c. 1231-66), king of Sicily, natural son of the Emperor Frederick II.; reigned from 1258. Excommunicated (1259) by Pope Alexander IV., Manfred overran Tuscany, and won the battle of Monte Aperto (1260), and subsequently met at Bene-vento (1266) Charles of Anjou, brother of Louis IX. of France, to whom Pope Urban IV. had offered the crown of Sicily. Manfred fell in the battle.

Manfredonia, scapt., prov. Foggia, Apulia, Italy, 23 m. N.E. of Foggia, on the Gulf of Man-fredonia. The town was founded in 1263 by Manfred, king of It has an old castle and Sicily. a cathedral. Figs and almonds are exported. Pop. (1901) 11,549. Mangaldan, tn., Luzon, Phil-

ippines, on s. shore of Gulf of Lingayen, 13 m. N.E. of Lingayen. Pop. (1896) 16,143.

Mangaldas, Sir Mathoobhai (1832-90), Bombay merchant, who took great interest in Hindu education and social reform. gave away enormous sums in charity, and bequeathed a large amount to found scholarships for Bombay graduates, to enable them to study in Europe.

Mangalore, seapt., municipality, and military station, dist. of S. Kanara, on the W. shore of Madras, India, 127 m. N.W. of Calicut. The roadstead is open; export trade with Arabia and the Persian Gulf. The town is the headquarters of the Basel Lutheran mission in India. Weaving, printing, binding, and tile manufacture are the chief industries. It has a Roman Catholic bishop and an ecclesiastical college. Pop. (1901) 44,108.

Mangan, JAMES CLARENCE (1803-49), Irish poet, was born in Dublin. He ranks high among Irish poets, there being fine spirit and quality in his verse. He also wrote German Anthology (1845), Munster (1849). An edition of his Poems, by D. J. O'Donoghue, appeared in 1903. See Life by M'Call (1887).

Manganese, Mn 55'0, is a metallic element principally found as pyrolusite (black oxide of manganese, MnO₂). The metal manganese, MnO₂). The metal is obtained by reducing the oxide with aluminium, and resembles iron, but is harder and very brittle, has a reddish tinge, and is more easily soluble in acids. Its specific gravity is 74, and it melts at 1,245° c. Pure manganese is used in the manufacture of very hard steel, and to alloy with copper, brass, and nickel. Whilst alloyed with iron as ferromanganese and spiegel-cisen, it is largely used in the preparation of mild steel. The compounds of manganese are extremely varied. for it unites with oxygen to no less than five different degrees. manganous salts, derived from MnO, represent the lowest stage of oxidation. They are pink, well crystallized, and soluble in water, and are precipitated by ammonium sulphide and alkalis. Manganese dioxide, MnO2, is the source of manganese and all its

derivatives. It is a black solid with feeble basic properties, forming unstable salts: that given by hydrochloric acid, MnCL, decomposes on heating, and yields chlorine, a process by which chlorine is largely prepared on the commercial scale. Manganese dioxide is also employed to improve the colour of glass and as a depolarizer in the Léclanché and dry cell. The higher oxidation derivatives of manganese-riz. manganic and permanganic acids - are best known in their alkali salts. The manganates are green, and are converted into permanganates by the action of acids. Sodium and potassium permanganate have a deep purple colour and powerful oxidizing action, which is made use of in analysis and for disinfecting purposes.

Mange. See Dogs -Discuses of. Mangel - wurzel, an agricul-tural root introduced into Britain by Thomas Boothby Parkins in 1786. It belongs to the Chenopodiacen or goose-foot order, and is described botanically as Beta maritima. It is closely allied to both garden beet and sugar beet, and in the wild form is indigenous to the British Isles. There are several cultivated varieties, distinguished by the size and colour of the root; they are usually described as long red, red globe, long yellow, and yellow or orange globe. In the following properties mangel-wurzel is superior to turnips and swedes; it keeps sound and good for twelve months; it resists drought, and rather prefers a hot and dry season; it produces a heavy crop per acre; it will thrive on land that is too strong for turnips; it is very useful in late spring and throughout summer. On the other hand, it requires liberal manuring, and is more expensive to cultivate. must be lifted before frost. As a food, it contains a higher percentage of dry matter than either turnips or swedes; and it is rich in sugar, which increases in value by keeping. Fifteen loads of farmyard manure and 2 cwt. of sodium nitrate to the acre on good land should produce forty to fifty tons per acre, though more have been grown. The seed should be drilled in rows, 18 in. apart, about the third week in April, and the crop lifted in October.

Manghishlak, region of Transcaspian prov., Russian Central Asia, bounded E. by Khiya, and w. by Caspian. Area, 60,000 sq. m.; pop. 150,000, mostly Kirghiz. Capital, Fort Alexandrovsk.

Manglaur, tn., Saharanpur dist., United Provinces, India, 48 m. N. by E. of Meerut. Pop. (1901) 10,763.

Mangnall, RICHMAL (1769-1820), English schoolmistress, born probably at Manchester;

educated at Crofton Hall, near Wakefield, Yorkshire, where she hecame a teacher, and ultimately She is chiefly schoolmistress. remembered for her Historical and Miscellancous Questions for Young People (1800), a Compendium of Geography (1815), and Half an Hour's Lounge, or Poems (1805).

Mangonel, an engine formerly used in war for battering down walls and hurling missiles. It was worked by counterpoise, and possessed great accuracy in aim.

Mangosteen, the fruit of a tropical evergreen tree, Garcinia manyostana, belonging to the order Guttiferae. The tree is a native of the Straits Settlements, and its round fruit is wonderfully delicious in flavour.

Mango Tree (Mangifera indica), an East Indian evergreen tree of the order Anacardiacea, growing almost 60 ft. high, and bearing in summer panicles of yellow-streaked white flowers, followed by kidney-shaped, redand-yellow fruit. It is sometimes cultivated as a stove plant in Britain, and requires a fairly rich compost containing peat.

Mangrove, or Rilizophora, a genus of tropical trees belonging to the order Rhizophoracese. It grows in swampy ground, and gradually reclaims land from the ocean's edge, both by the advance of its roots and by the habit of the seeds, which germinate whilst still attached to the parent tree. the young trees ready formed with roots and branches dropping into the water in advance of the parent stems.

Manhattan Island. See NEW York.

Mani. See Manichæism.

Manichæism, a dualistic system of religion which originated in Persia in the early 4th century. Its originator was one Mani, or Cubricus, who was born in Babylonia c. 216 A.D. Professing to have been the recipient of supernatural revelations, Mani trav-elled extensively in the East, even to India and China. He won the recognition of the Emperor Shapur, exercised considerable influence under Hormizd I., and was finally put to death by crucifixion and flaying by Bahram I. He composed the Book of Secrets, the Book of Precepts for Hearers (or Epistola Fundamenti), and the Book of Making Alive (or The-saurus Vitæ). His teaching is founded on the dualism characteristic of Persian speculation, and is indeed only a materializa-The spirits of light tion of it. send upon the earth a succession of prophets, Noah, Abraham, Zoroaster, Buddha, and Jesus pati-bilis, who is pure spirit, his body being but a phantom (Docetism); while Mani himself, the last pro-

duct of the divine element, comes to carry on the work of Jesus and Paul-viz. the separation of light from darkness. His followers are the elect or the initiated, who shall at the destruction of the world enter the perfectly pure kingdom of light. They meanwhile purify themselves by abstinence from the world, even from touch, so far as possible. Manichæism is a syncretism of Persian and Christian ideas, and Buddhist elements are not wanting; its practice of baptism reveals a connection also with the Mogtasilah. who are represented by the modern Mandaans. It made great progress in its native region, its chief centre being Babylon, and later Samarkand; and it came into notice in the West about the time of Diocletian. In spite of persecution the sect spread rapidly, especially after the reign of Constantine; was prominent in N. Africa in the age of Augustine; and lasted well into the middle ages, exercising an influence on the Bogomiles, the Catharists, and other schismatic groups. See F. C. Baur's Das Manichäische System (1831); Geyler's Manichäismus u. Buddhismus (1870); Flügel's Mani's Lehre u. Schriften (1862); and fragments of Mani's writings in the Bib. Græca of Fabricius, vii. 323 ff.

Manifest, or SHIP'S MANIFEST, a document signed by the master, owner, or agent of a ship at the place of lading, and lodged with the proper customs officer. It must give a description of the vessel, crew, passengers (if any), ports of destination, and a full account of all the cargo, with marks, descriptions, consignors' names, etc.; if for a foreign port, the coal or fuel for use on the voyage must also be stated.

Manihiki, or Penrhyn, group of twelve coral islands in Pacific, N. of Society Is.; annexed (1888) by Great Britain, and including Caroline or Thornton I., Manihiki, Penrhyn, and Suwarrow. Included in New Zealand, 1901. Area, over 50 sq. m. Pop. 1,700.

Manihot, a genus of American shrubs and herbaceous plants belonging to the order Euphorbiaceae. The roots of M. utilissima and M. Aipi are the sources of cassava meal and taploca. See CASSAVA.

Manikaland, country of S. Africa, divided between Portuguese E. Africa and Rhodesia (Mashonaland). The railway from Beira to Fort Salisbury runs through it. The country is noted for its gold fields.

Manila, cap and chief port of the Philippines, on w. coast of island of Luzon, at the mouth of the river Pasig, and at the head of a large bay affording excellent anchorage. Under Spanish rule it was largely dominated by the religious orders, and its architectural features were heavy and sombre. It is an archiepiscopal see, and possesses a cathedral and a university. Manila is now the naval base of the United States in the Far East. Pop. (1901) 244,732.

Manila Bay, BATTLE OF. During the Spanish-American war of 1898, a Spanish squadron in Manila Bay, under Admiral Montijo, was destroyed on May 1 by a United States squadron under Commodore George Dewey.

Manilius, two Romans of note.
(1.) GAIUS MANILIUS, tribune in 66 B.C., who proposed the Manilian law which gave Pompey full command in the Mithridatic war. Cicero delivered a speech, Pro Lege Manilia, in support of this law. (2.) MARCUS or GAIUS MANILIUS, a Roman poet, who lived most probably in the Augustan age. He is known solely by his poem Astronomica. Editions: Bentley (1739), R. Ellis's Nootes Manilianae (1891).

Manilla Hemp, or ABACA, a name given to the fibre obtained from a plantain (Musa textilis) common in the Philippines. It is exported in large quantities, and used like true hemp for cordage, sail-cloth, and other fabrics. See HEMP.

Manin, Daniele (1804-57), Italian patriot, was born at Venice. From 1831 he became a leader of liberal opinion in Venice, and was imprisoned; but the outbreak of 1848 set him at liberty, and he was made head of the Venetian republic, and is counted as the last doge. He organized the defence against the Austrians for five months. See Ferrari - Bravo and Marloni's Daniele Manin e i suoi Tempi (1904).

Maning, FREDERICK EDWARD (1812-83), Irishman, who became a naturalized Maori, having settled at Onaki, New Zealand (1833). Maning rendered services to both sides during the war (1845-61), and was appointed one of the judges for settling land-titles (1865). He wrote Old New Zealand (1863) and The History of the War. . . in 1845 (1876). Manioc. See Cassava.

Manloc. See Cassava.
Manlpur, or IMPHAIL. (1.)
Feudatory state of India, between Assam and Upper Burma.
Area, 8,300 sq. m. It consists
mainly of an extensive valley;
its products are tea, cotton, rice,
tobacco, opium, and indigo. It
has been under British control
since 1825; in 1891 some British
officials were treacherously murdered. Pop. (1901) 284,465. (2.)
Capital of above state, 226 m.
N.W. of Mandalay. Pop. (1901)
67,093.

Manis. See Pangolin.

Manissa, tn., Asia Minor, on l. bk. of Gediz-chai, 21 nn. N.E. of Smyrna by rail. Manufactures cotton goods. At one time it was noted for lodestone. Pop. 38,000.

Manistee, city, Michigan, U.S.A., co. seat of Manistee co., 100 m. N. of Grand Rapids. It produces chiefly salt and lumber.

Pop. (1900) 14,260.

Manitoba, prov., Dominion of Canada, bounded s. by United States, and E. by Ontario. Area, 73,732 sq. m., chiefly of the finest agricultural land. Its surface is flat, and is traversed by the Assiniboine, the Souris, the Pembina, the Red River, and the Winnipeg. There are several large lakes—c.q. Winnipeg (9,457 sq. m.), Winnipegosis (2,086 sq. m.), and Manitoba (1,817 sq. m.). The climate is liable to extremes of heat and cold, and is severe in winter, the mercury falling at times as low as 50° below zero. Fine wheat is grown, and cattle-raising is carried on. Pop. (1901) 255,211. The people are largely Presbyterians. The province is represented at Ottawa by four senators and ten members of the House of Commons. This province has undertaken the construction of a railway from Winnipeg to Hudson Bay. The construction of the transcontinental route practically created the province, and the N. Pacific has direct connection with Winnipeg and Brandon. Down to 1868 Manitoba formed part of the territory controlled by the Hudson's Bay Company, and the province of Manitoba was constructed in 1870. It was in it that the first Riel rebellion broke out, in 1869-70. It was in Manitoha that Lord Selkirk's Red River Colony was settled (1812).

Manitoba Lake, Canada, situated 60 m. s.w. of Lake Winnipeg, into which it is drained by the Little Saskatchewan. Its length is about 120 m., and its breadth 25 m. Area, 1,817 sq. m.

Manitou, the great spirit of the North American Indians, who figures in the legend of Hawadha, as presented by Longfellow. But there are many manitous in the Indian pantheon. Every tribe and every clan has its own protecting god, and so also every individual. These gods or manitous are all animals, so that the manitou is the tribal or individual totem.

Manitou, tn., El Paso co., Colorado, U.S.A., 6 m. N.w. of Colorado Springs, in the midst of magnificent scenery, at the junction of three great cañons, and at the base of Pike's Peak. Hence it is a great summer resort. Near it is the famous 'Garden of the Gods.' Its mineral springs also attract visitors. Pop. 1,300.

Manitoulin, group of islands in Lake Huron. Except for Drummond I., which belongs to Michigan, they are Canadian. The largest is Grand Manitoulin, or Sacred Island, 90 m. long and from 5 m. to 30 m. broad. Many of the villages on the islands are summer reserts. Pop. 2,000.

summer resorts. Pop. 2,000.

Manitowoc, city, Wisconsin,
U.S.A., co. seat of Manitowoc co.,
on Lake Michigan, 80 m. N. of
Milwaukee. Pop. (1900) 11,786.

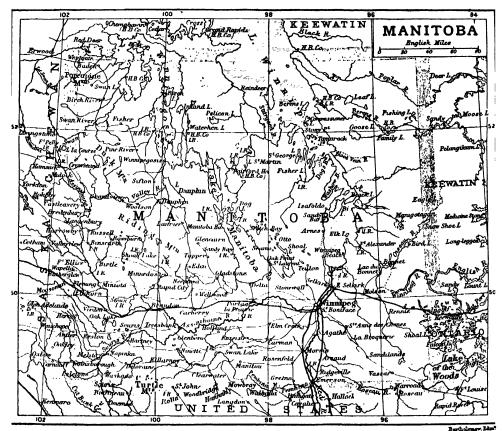
Manizaies, tn., Antioquia, Co-

cause of the plebeians against the patricians; he was accused of treason and executed.

Manlius, Torquatus. See

Mann, Horace (1796-1859), American educator, was born at Franklin, Massachusetts. During 1837-48 he was secretary of the Massachusetts Board of Education, and from 1853 until his death president of Antioch College, Ohio. He wrote Lectures on Education (1848); Report of an

ganization of the dock labourers after the dock strike of 1889, and has since been secretary of the London Reform Union (1893), of the Independent Labour Party (1894), and of the National Democratic League. He was a member of the Royal Commission on Labour in 1892. He was active in labour agitation in Australia in 1906. His writings include A Socialist's View of Religion (1896), and The Programme of the I.L.P. and the Unemployed (1895).



lombia, 72 m. s. of Medellin; exports gold, coffee, and cocoa. Pop. 20,000.

Mankato, city, Minnesota, U.S.A., co. seat of Blue Earth co. on Minnesota R., 85 m. s.w. of St. Paul Pop. (1900) 10 509

of St. Paul. Pop. (1900) 10,599. Maniius, Marcus, was consul of Rome in 392 B.C. When the Gauls captured the city in 390, he took refuge in the Capitol, and one night, when the Gauls attempted to scale the rock, Manlius was awakened by the cackling of the sacred geese. Six years afterwards he upheld the

Educational Tour in Germany, Great Britain, and Ireland (1846); and Letters and Speeches on Slavcry (1851). His works are collected in 5 vols. by G. C. Mann (1867). See Lives by Mrs. Mann (1865; new ed. 1882), A. Winship (1896); B. A. Hinsdale's Mann and the Common School Revival in the United States (1898); G. A. Hubbell's Horace Mann in Ohio (1990).

Mann, Tom (1856), English labour leader and organizer, was born at Foleshill, Warwickshire. He took & leading part in the or-

Manna, a saccharine exudation from the stem of two deciduous trees, the flowering ash (Frazinus ornus) and the round-leaved flowering ash (F. rotundifolia), natives of Calabria and S. Europe. These trees grow to twenty-five or thirty feet in height, and bear dense terminal panicles of whitish flowers. The manna (flake manna) is obtained in summer by making incisions in the bark. This consists of stalactiform pieces of a pale yellowish colour, with a faint, sickly smell and a sweet taste. The manna caten by the

Israelites in the wilderness is generally considered to have been the saccharine exudation of a species of tamarisk (*Tumurix mannifera*), the sap being set flowing by an insect of the Coccus genus.

Mannargudi, tn., Tanjore dist., Madras, India, 24 m. E.S.E. of Tanjore; has a fine pagoda much resorted to by pilgrims. Pop. (1901) 20,449.

Manners. See RUTLAND and GRANBY.

Manners, Charles, stage name of Southcote Mansergh, managing director of the Moody Manners Opera Company; first appeared in the comic opera of Claude Duval, and created the part of Private Willisin Jolanthe. He has done much to promote popular interest in opera. Mr. Manners married Miss Fanny Moody, the English prima donna.

Mannheim, tn., grand-duchy of Baden, Germany, at the confluence of the Neckar with the Rhine, 39 m. by rail N. of Karlsruhe; one of the principal trading centres of S. Germany. Its industrial establishments include iron foundries, machine shops, sawnills, chemical, woollen, carpet, and glass works. A large palace, built in 1720-9, formerly the residence of the elector of the palatinate, faces the Rhine to the S. W. of the town. Founded at the beginning of the 17th century, Mannheim suffered severely during the Thirty Years' war, and was again destroyed in 1689 by the French. Pop. (1905) 162,000.

Manning, HENRY EDWARD (1808-92), English cardinal, was born at Totteridge, Hertfordshire. He was appointed rector of Woollavington, Sussex (1833), became famous for his eloquence, and upheld the Tractarian movement with vigour. He was appointed archdeacon of Chichester (1840), and for some time was a leader of the High Church party; but eventually he joined the Church of Rome, and was or-dained priest (1851). He founded the Congregation of the Oblates of St. Charles, London (1857), became archbishop of Westminster (1865), and cardinal (1875). Manning strove to advance the education and social condition of the people. He wrote The Temporal and the Internal Mission of the Holy Ghost (1865), and The Eternal Priesthood (1883). See Manning's Cardinal Manning (1892); Maynell's Memorials (1892); and Lives by Gasquet (1895), Purcell (1896), and Rosmer (1896).

Manning, ROBERT. See MANNYNG.

Manning the Navy. Under the Plantagenets soldiers were commonly embarked to fight at sea; but by the reign of Elizabeth the navy was manned almost exclusively by sailors. From the beginning of the 17th century, impressment had largely to be depended upon to supplement the volunteer seamen. A few years after the passing of the Navigation Act of 1661 the bounty system was established; and it became customary to give six weeks' or one month's advance pay. In 1705 justices of the peace were called upon to find seamen in their districts; and in 1733 a proclamation offered a bounty of twenty shillings for an able seaman and fifteen shillings for a landsman. During the wars of the 18th century even outward bound merchant-ships were not exempt from the press, and jailbirds, ticket-of-leave men, and vagrants of all kinds were got hold of by various ways. In 1795 an act was passed by which



Henry Edward Manning, (Photo by Russell & Sons.)

each county had to furnish a certain 'quota of men.' But it was not until after the issue of the report of a Committee on Manning, in 1853, that the problem was finally solved by the adoption of continuous service.

Mannite, or Mannitol, C₆H₈ (OH)₆, the simplest of the hexalydric alcohols, occurs in many plants, particularly Fraxinus orms, from the dried exudation of which, or manna, it is extracted by solution in alcohol and crystallization. It may be prepared by reduction of dextrose or levulose with nascent hydrogen, and occurs in dextro-rotatory (the natural variety), levo-rotatory, and inactive forms, the latter obtained synthetically. Mannite forms colourless crystals that have a sweet taste and are soluble in water and alcohol. If can be

oxidized to levulose, and on heating forms anhydrides.

Mannlicher, FERDINAND, BARON VON (1848-1904), German inventor, born at Mainz; was a railway engineer until 1886, and about 1885 became famous through the invention of the repeating rifle which bears his name. The system has been adopted by several European states.

Manns, Sir Augustus (1825), musical conductor, born at Stolzenberg, in Pomerania. After considerable experience in regimental bands and in Gungl's orchestra in Berlin, he became conductor and solo-violin at Kroll's Gardens, then bandmaster in a crack regiment at Königsberg, and finally (1855), conductor of the Crystal Palace Orchestra, London, which he raised to the highest pitch of excellence. He inaugurated the Saturday concerts. In 1905 he resigned the conductor ship. He was knighted in 1903.

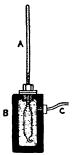
Mannyng, Robert (?1260-1340?), English poet, commonly known as Robert of Brunne, was born at Brunne or Bourne in Lincolnshire, and was a canon of the Gilbertine order of Sempringham. In 1303, under the title of Handlyng Synne, he translated, with additions, the Manuel des Pechiez of William of Wadington, illustrated with rude tales. Between 1327 and 1338 he produced a rhymed Chronicle, the first part of which is a pretty close translation of Wace, the second a translation of Piers of Langtoft. The Handlyng Synne was edited by F. J. Furnival for the Roxburghe Club (1862).

Manœuvres are those military exercises, on a more or less large scale, which complete the course of instruction of troops in peace by imitating as far as possible the circumstances of war. The German successes in the Franco-German struggle of 1870-1 drew attention to the importance of manœuvres and their especial value in the training of officers, and all continental states now practise them every year. In Great Britain something is done, but nothing like enough. In India, however, there are annual camps of exercise. In Germany, in addition to regimental, brigade, and divisional manœuvres, there are also special manœuvres on a larger scale, in which several army corps and cavalry divisions are assembled. The reserves are not called up for the annual manœuvres. In France the autumn manœuvres are carried out at the period when the reserves are called up to their corps. See NAVAL MANGUVRES.

Man - of - War Bird, a term

Man-of-War Bird, a term sometimes applied to the frigate bird, and also sometimes to the albatross and the skua.

Manometers are instruments for measuring liquid or gaseous pressures. In general they act on one of three principles: the pressure in question is balanced against either (1) the hydrostatic pressure of a column of liquid, (2) the pressure of a gas, or (3) the force required to deform a spring or raise a weight. In the first class the pressure exerted is proportional to the product of the height into the density of the liquid balanced; and in metric units, pressure in gm. per sq. cm. = ht. in cm. × density. Manometers of this type, as a rule, give the difference of pressure above or below that of the atmosphere; the liquid being exposed on the one hand to the unknown pressure, and on the other to the atmosphere, and they require a reading of the barometer to get the true pressure. This difficulty may be got over by closing one end of the tube and exhausting it of air,



Air Manometer for high pressure.

A. Thick-walled glass tube; R. iron cylinder filled with mercury; C. flexible connection.

when the true pressure is at once obtained from the difference of levels, as in the mercurial barometer. In the second class, which are capable of dealing with greater pressures without becoming cumbrous, the pressure is set to compress a gas enclosed in a tube by an intervening column of liquid, usually mercury. The pressure exerted is, in terms of Boyle's law, inversely as the volume to which the gas is compressed; or if v is the volume at a known pressure P, such as that of the atmosphere, and v' the volume at the unknown pressure P', then P'=P× V.

This type of instrument is particularly useful in experiments on the compressibility and critical point of gases; but allowance may have to be made for any deviations which the gas used in the manometer may exhibit from Boyle's law, and for any difference of level of the confining liquid that may be set up. Manometers of the third class, in

which, as a rule, a spring is deformed, are the ones most used for commercial purposes—e.g. as steam and vacuum gauges. A good type is that of the Bourdon pres-



Bourdon Pressure-gauge.

sure-gauge, in which a curved tube of elliptical section tends to straighten itself as its section becomes rounder when subject to internal pressure. This straightening is magnified and transmitted by suitable mechanism to a hand moving over a dial. Such instruments require to be calibrated by comparison, eventually, with a manometer of one of the other classes, and are not capable of such a high and permanent degree of accuracy, as the elasticity of the spring is not perfect or permanent. This is evident in permanent. This is evident in the aneroid barometer, which is a manometer of this class. See Ostwald's Physico-chemical Measurements (trans. Walker, 1894).

Manor. A manor is, in English law, an estate in fee simple in a tract of land granted by the sovereign to a subject in consideration of some service. subject in turn grants portions of the estate to others, who hold of him a process known as subinfeudation. The creation of new manors has become impossible since the statute of *Quia Emptores* (1289). A manor usually includes a manor boxes with includes a manor-house with demesne lands, freehold tene-ments, copyhold tenements originally carved out of the demesne lands; waste and common of the manor; a court baron, of which the freeholders are the judges; and a customary court baron, of which the lord or his steward is the judge. The chief officer of a manor is the steward, who transacts on behalf of the lord the legal business of the manor, and receives the customary fees. Inside the manor all questions are determined by reference to custom, and the laws of inheritance and the like are often quite different from the common laws. A manor becomes extinguished if it ceases to have two freehold tenants. See also COPYHOLD, tenants.

HERIOT; and Scriven On Copyholds and Vinogradoff's The Growth of the Manor (1905).

Manresa, city, prov. Barcelona, N.E. Spain, 30 m. N.W. of Barcelona. It is an ancient Roman city (Minorisa), and famous for its heroic defence (1808-11). Here is the cave of St. Ignatius, where Loyola saw his visions. There are manufactures of cotton, woollen yarns, and silk goods. Pop. (1900) 23,225.

Manrique, Gomez (? 1415-91), Spanish poet, many of whose best works were rediscovered in 1.85, and published by Paz y Melia in 1886. His contemporary fame rested mainly on his didactic verse in the Italianate style of Juan de Meña and the Marquis de Santillana, his uncle. The best are Regimiento de Principes, Consejos a Diego Arius, and Prosecution de los Vicios y Virtudes. He also wrote a sacred and a secular play, which are among the first true dramas in the Spanish language.

Manrique, JORGE (1440-78), Spanish poet, nephew of Gomez Manrique, wrote a set of elegiac couplets on the death of his father, which rank amongst the great poems of the world. Longfellow has translated (1833) them into English. The poet was killed in the civil wars under Isabel the Catholic. His poems were edited by Foulché-Delbose (1905).

Mans, Le, tn., cap. of Sarthe dep., France, on riv. Sarthe, 30 m. s.e. of Alençon. The cathedral contains the tomb of Berengaria, queen of Richard, Cœur de Lion. The principal manufactures comprise ironmongery, machines, clocks and watches, linen goods, and chemicals, especially sulphuric acid. The town was the birthplace of Henry II. of England, and the scene of a battle in 1793 between the French republican troops and the Vendean forces. On Jan. 10-12, 1871, Chanzy was defeated by the Germans under Prince Frederick Charles. Pop., including its suburb Pré (1901), 63,272.

Mansard Roof, ascribed to the French architect François Mansart (1598-1666), is composed of two superimposed planes on each side, the lower two being the steeper.

Manse, legally the dwelling-house of the minister of the Established Church in Scotland in a landward (i.e. rural) parish, or a parish that is partly landward and partly burghal. Originally the term manse was applied to the piece of land set apart for the clergyman, which is now called 'the glebe.' The manse must be built and repaired by the heritors or landed proprietors of the parish. An incumbent is entitled to have a manse put in

proper repair on entry, and it may then be declared a free manse,' and the incumbent will then be liable for ordinary repairs for fifteen years. Two acts of 1824 (5 Geo. IV. c. 72 and c. 90) make provision for relieving poor parishes, and for building manses in the Highlands and Islands.

Mansel, HENRY LONGUEVILLE (1820-71), English metaphysician, was born at Cosgrove, Northamptonshire; elected reader on moral and metaphysical theology at Oxford (1855); appointed Bampton lecturer (1858), pro-fessor of ecclesiastical history (1866), and dean of St. Paul's (1868). In metaphysics Mansel followed Sir William Hamilton in maintaining the relativity and conditioned nature of knowledge. His chief publications were Prolegomena Logica (1851), Man's Conception of Eternity (1854), On the Philosophy of Kant (1856), Bampton Lectures (1858, 1859, and 1867), and The (Inostic Heresies (1874)

Mansergh, JAMES (1834-1905), English civil engineer, was born at Lancaster. He began his professional career on railway work, but is best known by his sewerage, drainage, and water-works schemes, including the Elan Valley water scheme for Birming-

ham, opened by the King (1904).

Mansfeld, Peter Ernst,
Count (1517-1604), imperialist soldier, who, during the war which followed the revolt of the United Provinces from Spain, proved himself one of the most successful of the generals on the Spanish side, and was for a short time entrusted with the govern-ment of the Spanish Netherlands. -His illegitimate son, COUNT PETER ERNST (1580-1626), was even more famous as a military leader. He served first the king of Spain in the Netherlands, then the emperor in Hungary, but received no adequate recognition of his services. Thereupon he became a Protestant (1610), and was engaged in war in Bohemia and in the Rhine provinces on behalf of the Count Palatine, and in 1622 inflicted a crushing defeat on Tilly at Wiesloch. In 1624 he raised an army with the aid of French and English subsidies, but was defeated by Wallenstein at Dessau in 1626. He raised another army, and marched into Hungary to join Bethlen Gabor, but died suddenly near Serajevo. It was he who set the fashion of freely quartering his troops upon the country they occupied, or of 'making the war itself support his troops.' See Villermont's Ernest de Mansfeld (1866), and Utterodt zu Scharfenberg's Ernest Graf zu Mansfeld (1867).

Mansfield. (1.) Municipal bor., Nottinghamshire, England,

14 m. N. of Nottingham, has ironfounding and coal-mining, and the manufacture of hosiery, lace thread, and boots. Frame-knit-ting has declined. Courts for the Forest of Shorwood were held here till 1715. Pop. (1901) 21,441. (2.) City, Ohio, U.S.A., co. seat of Richland co., 70 m. s.w. of Cleveland. It manufac-tures agricultural implements.

Pop. (1900) 17,640.

Mansfield, WILLIAM MURRAY,
EARL OF (1705-93), British judge,
was born at Perth, and became
solicitor-general in 1743, and attorney-general in 1754. He was created chief-justice in 1756, but still remained a member of the This anomalous posicabinet. tion, and the fact that his political opinions were of a reactionary character, created a popular dislike against him, and his house was burned down during the Gordon riots (1780). He resigned the chief-justiceship in 1788.

Mansfield College, Oxford,

England, is a non-residential theological college, founded in 1886, and opened in 1889, for the education of nonconformist ministers. Mansfield House, in Canning Town, London, E., is a settlement in connection with the college.

Mansion House, London, the official residence of the lord mayor, built in 1739, contains a large banqueting hall, a fine picture-gallery, and many curiosities. Funds are collected at the Man-sion House for distribution among sufferers from war, pestilence, floods, and other misfortunes.

Manslaugh-Manslaughter. ter is the unlawful killing of another without malice aforethought. Manslaughter is either (1) voluntary, or (2) involuntary. (1.) Voluntary, as when, upon a sudden quarrel, two persons fight and one kills the other, or when a man greatly provokes another by some personal violence and the other immediately kills him. The act causing death must be done at once, otherwise the homicide would be a deliberate act of revenge, and therefore murder. (See also SELF-DEFENCE.) (2.) Involuntary, when the death, not being directly intended, is caused in the commission of an unlawful act, or even a practical joke, not amounting to a felony, or by the culpable neglect of a duty imposed upon the accused-e.g. negligent driving or gross negligence by a doctor. Manslaughter is a felony, and is punishable by penal servitude to the extent of life, or by imprisonment, or fine, or both. In Scotland manslaugh-ter is called 'culpable homicide.'

Manson, George (1850-76), Scottish painter, born in Edinburgh; devoted himself to watercolour painting (1871). Some of his best sketches were made in Sark (1874), in the Channel Islands. His pictures are refined in drawing and colour. See Gray's George Manson.

Mansûrah, cap., prov. Dakaliyeh, Lower Egypt, near W. shore of Lake Menzaleh; a centre of the cotton industry, and makes also

mant, RICHARD (1876-1848), bishop of Down, Ireland, was born at Southampton, and appointed bishop of Killaloc and Kilfenoragh (1820), being translated to Down and Connor (1823), with Dromore added (1842). Mant wrote an Annotated Bible (with D'Oyly, 1814), and History of the Church of Ircland (1840). Memoir by Berens (1849).

Mantegna, Andrea (1431-1506), Italian painter and engraver, born at Vicenza. In him the epoch of art from the middle of the 15th to the early part of the 16th century in N. Italy found its highest expression, and is therefore commonly called the Mantegnesque. He was the pupil of Squarcione, and was influenced also by Donatello and Jacopo Bellini. Of his early paintings the most important are the Eremitani frescoes at Padua, the Agony in the Garden (National Gallery, London), and the triptych in the Uffizi Gallery, Florence. In 1466 he settled in Mantua as court painter to Lorenzo Gonzaga. Unfortunately, renzo Gonzaga. Unfortunately, few remain of his magnificent frescoes in the ducal palace, and those executed for Pope Innocent VII. in Rome have been destroyed. To his later years belong the beautiful Madonna della Vittoria (Louvre); The Triumph of Scipio, painted in gri-saille (National Gallery); and the fine Triumph of Casar (Hampton Court), much injured by restoration. Mantegna's paintings are inspired with the spirit of revived antiquity, executed with extra-ordinary technical skill, realistic accuracy, and great energy. He portrayed a wide range of human emotions, from the unconscious simplicity of childhood to the tragic intensity of mature age. See Andrea Mantegna, by Maud See Anarea manuegna, by manu Cruttwell (1901); Mantegna and Francia, by Julia Cartwright (Mrs. Ady), 1881; History of Painting in North Italy, by Crowe and Cavaleaselle (vol. i., 1870).

Mantell, Gideon Algernon (1790-1852), English geologist, born at Lewes, Sussex, and practised medicine at Lewes, Brighton, and Clapham. He was the first to discover and describe the Regnosaurus, Pelorosaurus, Hylæosaurus, and Iguanodon. His chief nosatrus, retorosatrus, riyarosatrus, and Iguanodon. His chief works are The Fossils of the South Downs (1822). The Wonders of Geology (1838), and The Medals of Creation (1844).

Mantes (Rom. Mcdunta), tn., dep. Seine et-Oise, France, on l. bk. of Seine, 30 m. N.w. of Paris. Its Gothic church of Notre Dame dates from the 12th century. The town has tanneries, saltpetre factories, and flour mills. Musical instruments and artificial incubators are manufactured. Large numbers of poultry are reared. Pop. (1901) 8,034.

Manteuffel, EDWIN HANS KARL, FREIHERR VON (1809 85), Prussian field-marshal, was born at Dresden, and entered the Prussian service in 1827. He precipitated the war over Schleswig-Holstein by marching his men into Holstein as a Prussian protest against the summoning of the estates (1866). He became commander-in-chief of the army of the Main, and defeated the Bavarians in various battles. When the Franco-German war broke out he succeeded in driving 80,000 French soldiers into Switzerland. Subsequently he became (1879) viceroy in Alsaco-Lorraine.

Mantinea, city of Arcadia in ancient Greece. In 385 B.C. it was taken by the Spartans, and was deserted until after the battle of Leuctra, in 371. Again in 222 it was taken by the Achæan League, and its independence destroyed. Two great battles are known by its name: the first in 418 B.C., when the Spartans defeated the Argives, Arcadians, and Athenians; the second in 362 B.C., when the Thebans defeated the Spartans.



Mantis (Hierodula raptoria).

Mantis, generally the members of the insect family Mantidæ, of which perhaps the most familiar member is the 'praying mantis' (M. religiosa) of Europe. Mantids are orthopterous insects, raptorial in habit, and most remarkable for the structure of the fore legs. These are large and strong, and, being armed with powerful spines. are admirably adapted for their natural function—that of catching the living insects upon which the animal feeds. Hardly less interesting, however, are the extraordinary forms often assumed by the insects. In not a few cases the limbs bear foliaceous expansions, which, when combined with the greenish colour of the body,

give the insects a peculiarly leaf-like appearance, and it is stated that many tropical forms exhibit a singularly detailed resemblance to flowers. Widely distributed over the warmer parts of the globe, mantids are entirely absent from colder regions, though twelve forms occur in the warmer parts of Europe.

See HERALDRY. Mantling. lt is an offence Man-trap. punishable with penal servitude for five years to set, or allow to be set, a man-trap or spring-gun (except in a dwelling-house for the protection thereof) with intent to harm trespassers or other persons. (1861, c. 100, s. 31; 1891, c. 69, s. 1.)

Mantras, in Hinduism, extracts from the Vedas. In the degraded form of Hinduism they are used as mysterious spells for the purpose of working magic or of averting evil.

Mantua (Ital. Mantora), city, cap. of prov. of same name, Lombardy, Italy, on the Mincio, 22 m. s.s.w. of Verona. The city is strongly fortified, the river, artificial lakes, and canals forming part of the scheme of defence. The water and the adjacent marshes render the town unhealthy. There are Renaissance churches, the most important being that of Sant' Andrea, and other buildings, such as the Corte Reale and the Palazzo del Tè, by Alberti and other famous architects; and the town possesses art treasures of Mantegna and Giulio Romano, both natives. It was the native town of Virgil, and there is a Virgilian academy. In addition to a theological institute, a botanical garden, observatory, and public library (80,000 vols.), there is a museum with Greek busts and sarcophagi. The city wears an air of gloomy decay. Pop. (1901) 30,194.

Manu, a mythical Brahman sage, supposed to have lived about five centuries before Christ. He is the reputed author of the code which bears his name, though it is clear that the book is the work of more than one man. The Code of Manu, which was elevated to the dignity of sacred literature long before it came to be adopted as the basis of Hindu jurisprudence, is a philosophical treatise on the religious and social obli-

manures. All descriptions of refuse act as fertilizers—e.g. wool, hair, bones, flesh, blood, fish, seaweed, leaf - mould, and straw. Similarly, foods enrich the manure, on account of the residues which pass through the digestive system of the animals consuming them. Hence one approved method of improving land is to keep a large head of live stock, and feed them liberally with

purchased foods. It was only through the application of chemistry to agriculture that the true principles of manuring were brought to light, and the intimate connection between the soluble and insoluble salts which exist in fertile soils and the constituents composing the ash of plants was shown.

Artificial Manures. - As soon as it was discovered that the 'essence' of manures consisted of certain pure salts, it was clear that the water and purely carbonaceous matter that form the bulk of farmyard manure, and of refuse generally, were not of any true manurial value. They possess a mechanical value, but are not directly absorbed by growing plants. The roots of flowering plants feed exclusively upon pure salts. It has often been objected that artificial manures exhaust the soil by stimulating it to produce beyond its natural rate, but this objection is at best only a half-truth. The continued use of special manures, such as sodium nitrate or lime, do tend to ex-haust soil, simply because they only supply one ingredient. The main fertilizers are phosphatic, potassic, calcareous, and nitrogenous, and of these the first and the last are most important.

The accompanying table, from Warington's Chemistry of the Farm, shows clearly the amounts of the various ingredients removed by ordinary crops from one

acre of land.

Phosphatic Manures. - The original source of phosphoric acid in manures was bones, but mineral superphosphates have in a great measure taken their place. 1883 a valuable source of phosphoric acid was discoverd in basic slag, a by-product of the manufacture of Bessemer steel. It is actually the basic lining of the converter impregnated with the phosphoric acid which the lining abstracts from the fused ironstone at high temperatures. Basic slag contains from sixteen to twenty per cent. of phosphoric acid in the form of tetrabasic phosphate of lime, a compound which is easily decomposed in the soil. The basic slag is disinte-grated into an impalpable powder, and applied directly to the land at the rate of 5 or 6 cwt. per acre. It produces the most marked effects upon clay-soil pastures deficient in lime, and may also be used as a manure for all crops on arable land.

Potassic Manures are seldom applied directly; but in cases where land is naturally deficient in this important element, kainit may be used with advantage. Kainit contains over thirty per cent. of potassium sulphate, and is obtained from the lower beds of the Stassfurt salt mines in Germany. The usual dressing is

2 cwt. per acre.

Calcareous Manures.—Lime is useful in neutralizing free acid in the soil, and especially in combining with free nitric acid and forming calcium nitrate. It is applied in bulk in the form of chalk, hot or calcined lime, marl, and shell-sand. It forms an important element in basic slag, basic superphosphate, and ordinary superphosphate.

Nitrogenous Manures. — The best-known forms are sodium nitrate, ammonium sulphate, ammonium chloride, gas liquor, and Peruvian guano. They impart a dark, rich green to the foliage, and promote the growth of the herbaceous or strawy parts of plants. Nitrates speedily wash through the soil, and therefore concentrated nitrogenous manures are best applied during the time of active growth. A combination of mineral and

Minor, in which the skins of sheep were largely prepared for the purpose of manuscripts. In the earlier centuries schools or associations of scribes existed. To one of these schools at Alexandria we are indebted for the famous copy of the Scriptures known as the Codex Alexandrinus, written at the com-mencement of the 5th century, and now in the British Museum. In all the principal monasteries there was a scriptorium, or writing-room, in which the scribe was generally assisted by a dictator, who read aloud the text. The transcript was then revised by a corrector, and next handed over to a miniator, who added the ornamental work to the pages.

The oldest manuscript known is the *Papyrus Prisse*, in the Louvre at Paris, consisting of eighteen pages in Egyptian hieratic writing, ascribed to about B.C. 2500. The oldest Greek writing (not inscription) is on a

capitals, the uncial hand (meaning originally letters an inch long); next came the half-uncial, the Merovingian, the Carlovingian minuscule, the Hiberno-Saxon, the Roman or continental, the angular Gothic, and the court hands.

In regard to illuminated manuscripts, in the 4th, 5th, and 6th centuries we find little ornamentation beyond the rubricated or gilded letters of the actual text. The 7th, 8th, and 9th witnessed the perfection of the Hibernian style; the 10th, 11th, and 12th, the introduction and use of architectural forms; the 13th, 14th, and 15th, the growth of foliage under carefully studied natural laws—the 13th century being the age of the bud, the 14th of the leaf, the 15th of the flower; and in the miniatures, the 13th the age of gold, the 14th of diaper, the 15th the commencement of realistic painting. In the 16th century manuscripts became

Ingredients removed from an Acre of Land by Ordinary Crops.

	Pure Ash—lbs.	Nitrogen-lbs.	Potash.	Lime.	Magnesia.	Phosphoric Acid.	Chlorine.	Silica.	Soda.	Sulphur.
Wheat, 30 bushels	31	33	9:7	1.0	3.7	14.3	0.5	0.2	0.0	2.7
Straw, about 28 cwt	158	12	18.2	9.2	4.0	8.4	1.7	110.6	2.5	5.1
Barley, 40 bushels	443	35	9.8	1.3	4.0	16.2	0.4	12.0	1.0	2.9
Straw, about 22 cwt	100	12	21.6	8.5	2.5	4.4	3.5	51.5	4.2	3.2
Oats, 45 bushels	54	38	8.5	2.0	3.9	11.8	١	24.8	1.4	3.2
Straw, about 26 cwt	140	14	29.6	9.8	5.3	7.1	5.5	69.3	5.9	4.8
Meadow Hay, 1 tons	208	49	56:3	28.1	10.1	12.7	16.2	57.5	11.9	5.7
Red Clover Hay, 2 tons	255	102	87.4	86.1	30.9	25.1	9.4	6.8	4.1	9.4
Turnips and Leaves, 17 tons	364	120	148.8	74.0	9.5	33.1	22.1	7.7	24.5	20.9
Mangels and Leaves, 22 tons	690	147	262.5	53.3	46.9	49.1	90.4	25 0	140.6	14.0

nitrogenous manures always produces more effect pro rata than either applied separately. A complete manure, or one containing all the principal elements of plant nutrition, has been demonstrated to keep up the fertility of land even under such a trying ordeal as consecutive corn-growing, for fifty years in succession, at Rothamsted. See R. Warington's Chemistry of the Farm (15th ed. 1902).

of the Farm (15th ed. 1902).

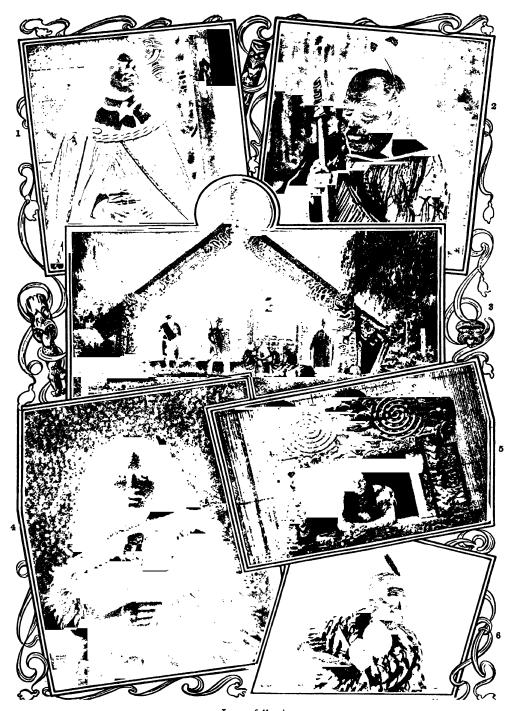
Manuscripts. The carliest specimens of manuscripts occur upon stone, metals, wood, baked clay, wax, linen, the bark and leaves of trees, and the prepared skins of quadrupeds, such as goats, sheep, and calves. The present article is restricted to writings on vellum or parchment—i.e. manuscripts proper. Vellum is prepared from the skin of the calf, and the finest vellum manuscripts are prior to the 8th century. The word parchment is said to be derived from Pergamus, a city of Asia

papyrus at Vienna, assigned to the period 280-70 B.C.; while the earliest Latin document is a wax tablet in the National Museum at Naples, clearly dated A.D. 55. Other famous manuscripts are the Cottonian Genesis, in the British Museum, the most ancient Greek Septuagint Ms., probably written in the 4th century; the Codex Simuiticus, the oldest of all the New Testament codexes, of date not later than A.D. 400; the Book of Kells, containing the four gospels in Latin, traditionally asserted to have be-longed to Columba, and written apparently in the 7th century; Alcuin's Bible, written in the Carlovingian minuscule hand; the Anglo - Saxon Chronicle; the manuscripts of Beowulf and Cadmon; and St. Margaret's Clospel Book, only recently discovered, and now in the Bodleian Library.

The earliest of Western manuscripts were written in Roman capitals; then followed rustic

merely costly appendages of luxury and taste. See Books in Manuscript, by F. Madan (1893), and Adler's About Hebrew Manuscripts (1905). See also INSCRIPTIONS, PAPYRUS.

Manutus Aldus, or Manuzio Aldo (1449-1515), promoter of typography and classical scholarship, born at Bassiano, near Velletri; settled at Venice (1490), where he founded the Aldine Press and the Accademia Aldina, with Bembo, Navagero, Musurus, Chalcondylas, Erasmus, and other scholars as correspondents. There he published the Aldine editions of the classics, which for typography and accuracy have ever commanded the admiration of all bibliophiles. Many of them are of great variety, especially the Horace (1497), the Virgil (1501), and the Rhetores Uraci (1513). He invented the type called italics, once called Aldine, first used in printing his edition of Virgil (1501)—the first octavo book ever issued. He is



Types of Maoris.

1. Portrait of Wahine, Mata. 2. The chief Patarangukai. (Photos by Valentine) 3. Wharepuni at Awahou Pah. 4. Maraea, a Maori belle.

5. Maggie, a Maori guide at Rotorus. 6. The Tohunga.

known as Aldus the Elder, to distinguish him from his son PAOLO (1490-1597), who continued the work, first in Venice, then at Rome under Pius IV. and Gregory XIII. See Renouard's Annales de l'Imprimerie des Aldes (1834).

Man in the Iron Mask. See IRON MASK.

Manzanares, city, prov. Ciudad Real, Spain, 27 m. E. of Ciudad Real. It contains an ancient castle. Pop. (1900) 11, 229.

ancient castle. Pop. (1900) 11, 229. Manzanillo. (1.) Town, Cuba, between Trinidad and Santiago. It ships tobacco, sugar, wax, and honey. Pop. (1899) 14,464. (2.) M.

ISLAND. See COLON.

Manzanita, a beautiful aromatic flowering shrub or small tree (Arctostaphylos ylauca), the chief home of which is in the Sierra Nevada of California, at from 2,000 to 3,000 ft. The roots and knots are utilized as walkingsticks and as veneer. The wood is fine-grained, of a dark red or mahogany colour, but twisted and crooked in form. The manzanita thickets which clothe the Californian hillsides, are laden in spring time with white and rose-coloured blossoms.

Manzoni, Alessandro (1785-1873), Italian writer and chief of the romantic movement in Italy, was born at Milan. His Inni Sacri (1815) testify both to his faith and to his espousal of the new literary theories. The Cinque Maggio (1822), a fine ode, inspired by the death of Napoleon, aroused general admira-tion. Two tragedies, the Conte di Carmagnola (1820) and the Adclehi (1822), mark a further severance from classical models. The great historical novel, Promessi Sposi (1827; best critical ed. by Petrocchi, 1893-1902), written on the model of Scott's works, depicts the state of Lombardy about 1630. It has retained its extraordinary popularity by reason of its perfect manner, the skill with which history and fiction are intermingled, and the profound interest of the story. Three English versions have appeared—1828, 1834, and 1844. See monographs by De Gubernatis (1879), Cantu (1885), Stampa (1885), Petrocchi (1886), Waille (1890), Key (1894), Bellezza (1898), Beltrami (1898), and Fabris (1901).

Maoris, aborigines of New Zealand. They are of the Polynesian race, their nearest kin being the Rarotongans of the Cook archipelago; but in physical and mental characters the Maoris differ in a marked degree from all the other members of the Polynesian family. The type, however, varies considerably—some being of a light colour, with straight black hair and regular Polynesian fea-

tures: others rather darky-brown. with curly or even frizzly hair. and the long, arched nose of the Papuan; while others display the dark complexion and coarser features of the New Caledonian Melanesians. Hence the inference that on their arrival they found the islands already occupied by a Melanesian race, whom they partly exterminated and partly assimilated; and this is entirely in accordance with their own traditions. From the native flax they wove and dyed clothes and mats, and lived together in strongly-fenced villages of wellbuilt huts. Graceful designs were tattooed on the faces of the great chiefs, whose heads were after-wards embalmed. The Maori language boasts of a rich oral literature, abounding in songs, proverbs, legends, creative myths, and more or less trustworthy The Maoris have traditions. steadily declined in numbers from perhaps 100,000 in 1840 to 65,000 in 1856 and 43,000 in 1901. These are mainly confined to North Island, where they have made some progress in the European arts and embraced various forms of Protestant Christianity. See John White's Ancient History of the Maori (6 vols. 1889); Sir G. Grey's Polynesian Mythology and Maori Legends (1885); F. E. Maning's Old New Zealand Pakeha-Maori (1884).

Map, sometimes incorrectly APES, WALTER (c. 1140-c. 1209), a Welshman by origin, and probably a native of Hereford, was a clerk of the court of Henry He also acted as justice itinerant in England, and in 1179 he was present at the Lateran Council in Rome. He was also canon, precentor, and eventually chancellor of Lincoln. He was the author of Latin verse of a satirical character, and of a collection of historical remicourt gossip, and folklore (De Nugis niscences, legendary Curialium). But his fame is mainly due to his supposed authorship of certain of the Arthurian prose romances. In fact, of all the Arthurian prose romance, two branches alone, the Merlin and the Tristan, have not been ascribed to Map. The fact that nowhere do we find Map, in the first person, claiming the authorship of an Arthurian romance, is a decided argument against such authorship, although it is not impossible that he may have been the author of an early version of the Lancelot story. See Hucher's Grand S. Graal (1875-8), and Ward's Catalogue of Romances in the British Museum (1883).

Maple (Acer), a genus of trees belonging to the order Aceraces, and containing nearly a hundred species. They are natives of the north temperate zone, and are specially abundant in N. America and Japan. They bear opposite, lobed or palmate leaves, and flowers in axillary racemes, followed by winged fruits. The two British species are A. campestre and A. pscudo-platanus, the former having erect and the latter pendulous racemes. Many varieties are cultivated for their beautifully tinted foliage. The wood has a satiny appearance, and is much used in finer cabinet work. From the sap of the American A. saccharinum large quantities of syrup and sugar are made by tapping the trees in early spring and collecting the sap.



Maple (Acer campestre).
1, Flower; 2, fruit.

Maps. A map is a representation of the earth, or a part of it, on a plane surface. The sheet is first covered with a network of parallels and meridians, the projection being chosen according to the extent and latitude of the continent or country to be represented, the scale, and the special purpose for which the map is intended. The chief points on the coast, the rivers, hills, etc., are generally deter-mined by astronomical observations, trigonometrical and topographical surveys. In most cases the draughtsman has only to take his main outlines from an existing map by reducing it (if necessary) to the desired scale with the aid of a pantograph or by photography. When the rough traverse surveys of a traveller in unknown countries have to be mapped, the nearest accurately determined points are marked, and then the route and other observations of the traveller must be adjusted to them. In general maps on scales less than 1:200,000, only the

large indentations of the coastline can be shown, many small rivers and tributaries must be omitted, and towns will be indicated by dots or small circles; while on a map of one inch to the mile, every farmhouse will be marked, and the general form of the towns, with some of the principal streets, will appear; and again on large town plans every alley and pavement can be shown. Mountains and smaller elevations of the ground are treated in a variety of ways. On treated in a variety of ways. On orographical maps of a small scale only a few contour lines are inserted, and the areas between these are coloured in shades; and the same method may be used on maps of a larger scale, the contour lines and shades being increased in treater. number. Frequently contour lines alone are used. Again, the configuration of a country may be rendered conspicuous to the eye by means of hatchings (ha-chures), which are drawn either horizontally or vertically; and different degrees of shade are produced by increasing the number or thickness of the hachures, and diminishing the distance between them. With these hachures two systems of illumination are used—the one in which the light is supposed to fall vertically, and the other in which the rays are supposed to make an angle of 45° with the vertical. In the former case level ground will be white, and the shade will increase with the steepness of the slopes; whereas in the latter slopes normal to the direction of the rays of light will be the lightest, and the flank of a hill turned from the light darker than the other. Several schemes of shading, regulating the number, thickness, etc., of the hachures have been devised. A more expeditious method is to use colour shading with one or the other of the above systems of illumination. Numerous conventional signs are used to indicate houses, bridges, roads, sand, rock, marshes, trees, etc.

Orgraphical maps show the elevation of a country with only sufficient of the general topography to mark the position of the ranges and peaks; political maps show kingdoms, principalities, states, counties, etc.; geological maps, the various rocks. Then there are statistical maps, showing density of population, productions of the land, industries, etc.; ethnographical maps, botanical and zoological maps, marine charts and sailing charts.

Maps are usually accompanied by a scale of miles, or the natural scale is noted—i.e. the ratio of a length on the map to the distance on the earth's surface that it represents. This scale can only be used when the area represented is small, for on maps of large parts of the globe it is exact only on the central parallel or meridian. An approximate result may be obtained by counting the interval on a meridian or the equator in degrees, each of which is equal to sixty geographical miles. Areas can be measured on equal area maps with a piece of glass ruled in squares, or with a planimeter.

The carliest map of which there is any record was engraved on a copper plate by Anaximander of Miletus about B.C. 580. Of other cartographers of ancient times may be mentioned Dicarchus, Posidonius, Hipparchus, Strabo, Marinus of Tyre, and, the greatest of all, Claudius Ptolemy. endeavoured to fix the latitudes and longitudes of his chief points. During the middle ages maps were constructed without parallels and meridians, the outlines were very inaccurate, and many fanciful details were introduced. Some improvement was intro-duced by the invention of the compass, which led to the construction of compass maps. With the dawn of the age of discovery, cartography revived, and mathematicians, following the example of Ptolemy, devised new methods of projection. Whereas the maps of the ancients were constructed by distances, points were now fixed as far as possible by astronomical observations. By the end of the 18th century most of the important European countries were mapped. The British ordnance survey was established in 1784, and in almost all European countries, in the United States, India, etc., surveying and map-construction are now executed by special state departments, with great accuracy and fullness of detail. For the best maps of the countries of the world, Mr. J. G. Bartholomew's articles on The Mapping of the World' in the S.G.M., vols. vi. and vii., may be consulted, which are accompanied by maps showing the relative values of geographical See PROJECTION. surveys.

Maqui (Aristotelia Maqui), an evergreen Chilean shrub belonging to the order Tiliacex. From the berries the natives make a febrifuge. It can be grown in the open against a south wall in the warmer parts of Britain.

the warmer parts of Britain.

Mar, old dist., Aberdeenshire,
Scotland, between the rivers Dee
and Don, and comprising Braemar, Cromar, and Midmar. It
gives title to the Earl of Mar.

Mar, EARLS OF, trace their descent in the female line to Gratney, Earl of Mar, married to a sister of King Robert I.; and in the male line to Henry de Erskine or Areskine, proprietor of that barony in Renfrewshire in the time of Alexander II. Be-

coming vested in the crown, the earldom was in 1562 bestowed by Queen Mary on her half-brother He ex-Lord James Stewart. changed it, however, for the earldom of Moray; and in June 1565 John, sixth Lord Erskine (d. 1572), the heir of the old line, received a patent of the entire earldom of Mar. After Mary was sent to Lochleven, Mar was entrusted with the custody of the young king, and on the death of Lennox (1571) he was chosen regent. His son John, second earl, of the Erskine line (1558-1634), succeeded to the charge of the young king. He was one of the leaders in the overthrow of Arran in 1584. On account of his leading part in the rebellion of 1715, John, sixth Earl of Mar (1675-1732), was attainted; but the estates were purchased for his son by Lord Ersking of Grange. In 1824 the attainder was reversed, and on account of the failure of male issue in 1866, the earldom in 1875 was declared to belong to the Earl of Kellie; but on Aug. 6, 1885, the title was conferred on John Francis Erskine Goodeve Erskine, who had married Lady Frances Jemima Erskine, the nearest female heir of the old line. See Crawford's Earldom of Mar (2 vols. 1882).

Marabouts, a class of religious devotees in the north of Africa who were the mainstay of the Almoravid dynasty of Spain and Morocco. They acted as priests in the mosques and other holy places, and were credited with the powers of prophesying and performing miracles. They were the backbone of the opposition offered to the French conquest in Algeria in the middle

of the 19th century.

Maracaibo. (1.) City, Venezuela, on an inlet of Maracaibo Lake. It exports coffee, hides, rubber, and asphalt. Pop. 35,000. (2.) GULF OF, or LAKE OF VENEZUELA, is bounded on the W. by Goajira peninsula. It is 12 m. broad farther s. (3.) LAKE, connected with above gulf by strait nearly 9 m. wide. It measures 100 m. from N. to S., and from 50 to 60 m. wide. The entrance is obstructed with shoals.

Maracci, Lodovic (1612-1700), Italian Orientalist, born at Lucca; made a name by an edition of the Koran, with notes (1698), and a Life of Mahomet. He was professor of Arabic at Rome, and a favourite of Pope Innocent XI.

Maragha, or MARAGA, old city, Azerbaijan, Persia, 50 m. s. of Tabriz; contains the tomb of the Mongol sovereign Hulagu Khan, who erected on the adjacent mountain a celebrated observatory. In the neighbourhood are cave temples. Pop. 13,260.

148 Marble

Maragogipe, tn., Bahia, Brazil, on r. bk. of Paraguassu;

with coffee, sugar, and tobacco factories. Pop. 15,000.

Marajo, or JOHANNES, isl. in the estuary of the Amazons and Para, N. coast of Brazil. Length, 165 m. (E. to w.); breadth, 120 m. In the wet season it is covered with water, and in the dry is clothed with grass.

Maramaros Sziget, tn., cap. of Maramaros co., Hungary, on Theiss R., and at the foot of Carpathians, 80 m. N.E. of Klausenburg. It has salt mines, sawmills, and a trade in lumber. Pop. (1900) 16,901.

Maranhão. (1.) State in Brazil, on Atlantic coast, S.E. of Para. Several short ranges oc-cupy the interior. The Parnahyba and Mearim rivers are navigable for some distance. The forests yield timber, vanilla, and medicinal substances, and coffee, tobacco, sugar, cotton, rice, and corn are grown. Silkworms are reared, and there are gold mines. Area, 177,560 sq. m. Pop. 500,000. (2.) Or sq. m. Pop. 500,000. (2.) Or St. Luiz de Maranhão, cap. of above state, on island between mouths of Mearim and Itapicuru rivers. Pop. 38,000.

Marano di Napoli, tn., prov. Naples, Italy, 5 m. N. w. of Naples;

produces wine, grain, and fruits. Pop. (1901) 10,252. Maranon. See AMAZONS. Maranta, a genus of tropical herbaceous plants belonging to the order Scitaminaceæ. They have creeping rhizomes, and bear terminal inflorescences. Marantas can be cultivated in the temperature of the stove, in a light sandy soil containing a fair proportion of leaf-mould. The roots of several species yield arrow-

Maraschino, a white liqueur distilled from a cherry grown in Dalmatia. It somewhat resembles kirschwasser, possesses a very pleasant flavour, and about 34 per cent. of alcohol by volume.

Marash, tn., vilayet Aleppo, Asiatic Turkey, at the foot of Mount Taurus, 90 m. N.E. of Alexandretta, its port. There are churches and schools belonging to the American mission and to the Jesuits. The principal trade is in Kurd carpets and embroideries. Hittite in-scriptions have been found in the vicinity. The town is be-lieved to occupy the site of the ancient Antiochia ad Jaurum. Pop. 50,000, one half Armenians.

Marasmius, a genus of mush-

rooms, with very tough gills which are not incised. They can be dried, and when soaked in water, they resume their forms. The champignon, or fairy-ring mushroom (M. oreades), belongs to this genus. It is of a pale red colour with white gills, and is valued as food.

Marat, JEAN PAUL (1743 93), French revolutionist, was born at Boudry, near Neufchatel. He set up in practice as a physician in London, and in 1777 was appointed physician to the bodyguard of the Comte d'Artois. Whilein London Marat published two volumes of his Essay on Man (1773), a political work called The Chains of Slavery (1774), and a treatise on the Discases of the Eyes. From 1783 till 1789 he devoted himself to the study of heat, light, and electricity. On the outbreak of the French revolution he wrote several pamphlets, and in September 1789 brought out the first number of the journal L'Ami du Peuple. Marat was by nature profoundly suspicious. Bailly and Lafayette were the early objects of his distrust, and the latter endeavoured to arrest him. Marat, however, escaped, and during Lafayette's supremacy was forced to hide. After the massacre of the Champ de Mars on July 17, 1790, Marat fled to England. In the Convention Marat represented Paris, and in the struggle between the Jacobins and the Girondists he took a leading part. In April 1793, at the instance of the Girondist government, he was tried, but was acquitted; and his acquittal was a serious blow to the party in power—'the martyr of liberty,' as Marat styled himself, became more popular than ever in Paris. But on July 13 he was nurdered by Charlotte Corday, a Girondist enthusiast. See Chèvremont's Jean Paul Marat (1880) and Bax's (1900).

Maratha, or MAHRATTA, a word meaning 'robber' or 'rebel.' The epithet was applied by the Mogul soldiery to those Hindus who rose against the tyranny of imperial Delhi. The term is now generally used to indicate the Marathispeaking Hindu population of India. The Marathas were once a power in India, where three Maratha states still exist—viz. Gwalior, Indore, and Baroda. The Maratha language is related to Sindhi and Gujarati, and is spoken by from fifteen to twenty millions of people. Its literature, beginning in the 13th century, is abundant. See James Grant Duff's History of the Mah-

rattas (1826).

Marathon, tn., Attica, ancient Greece, on E. coast, 25 m. N.E. of Athens; famous as the scene of the decisive victory gained by the Athenians over the Persians in 490 B.C. The mound raised over the Athenian dead was explored in 1890.

Marattia, a genus of tropical evergreen ferns with capsules opening by slits down their inner faces, belonging to the order Filices. They are desirable stove plants, thriving in a light, sandy soil containing peat. Their roots should have almost constant access to water. M. fraxinca, from Guinea, has fronds up to fifteen feet in length.

Maravedi, a Spanish coin of the 11th and 12th centuries, first struck at Cordova as a gold coin by the Almoravides. After 1474 it was the smallest Spanish bronze coin, value less than a farthing. It circulated down to 1848.

Marbeck, or MERBECKE, JOHN (1523-85), organist of St. George's Chapel, Windsor; published a Concordance and The Boke of Common Praier Noted (1550), an adaptation of plain chant to the first liturgy of Edward VI.

Marble, in strict usage, designates only those varieties of limestone which have become entirely crystalline by the operation either of heat or of pressure, and sometimes of both combined. Ordinary limestones are often converted into marbles by contact with molten igneous rocks, such as intrusive masses of granite. Its contained minerals often give marble a variegated colour, as they may be red or brown (e.g. garnet and idocrase), green (diops'de, actino-lite), black (spinel, graphite), or yellow(mica, chondrodite). If the limestone was originally pure, the marble is white. The best marbles are invaluable for statuary purposes, the finest of all being that quarried at Carrara in Italy. The ancient Greek sculptors used for their finest work Parian marble and marble of Pentelicus, both white. Marbles are used also in polished slabs for decorating interiors and as building stones; though when exposed to wet climates and to the impure atmosphere of cities they decay rapidly. The beautiful decay rapidly. The beautiful Connemara marble and the pinkish Tirce marble are two real marbles, but a great number of ornamental limestones are constantly and erroncously referred They come to this category. largely from Derbyshire, Staffordshire, Bristol, Devonshire, and Ireland. Some of them are black from the admixture of carbonaceous matter, but most of them are variegated. Others owe their beauty to the presence of white fossils (encrinites, corals, brachiopods) on a groundwork of different colour. Ruin marble has some resemblance to a drawing of ruined castles on a white back-ground. These are used princi-pally for mantelpieces, tabletops, pilasters, and for smaller objects, such as vases and paperweights. Imitation marbles are manufactured on a large scale by painting polished surfaces of wood or slate, or by mixing fragments of marble in a hard cementing matrix, and then sawing the mass into blocks and polishing these in the ordinary way. See Blagrove's Marble Decoration (1888), and Lee's Marble and Marble Workers (1888).

Marblehead, tn. and summer resort, Massachusetts, U.S.A., on Massachusetts Bay, 18 m. S.E. of Boston. The chief industries

or boston. The entitle industries are yacht-building and shoemaking. Pop. (1900) 7,582.

Marburg. (I.) Town, crownland of Styria, Austria, on l. bk. of Drave, 37 m. s.e. of Graz, is the seat of the bishop of Lavant. Here are railway workshops. Leather, flour, spirits, and beer are manufactured. Pop. (1900) 24,501. (2.) Town, prov. Hesse-Nassau, Prussia, on river Lahn, 60 m. N. of Frankfort, contains the 13th-century castle of the landgraves of Hesse, which was the scene in 1529 of the disputation between Luther and Zwingli. It has a university, founded in 1527, and manufactures leather, pottery, machinery, surgical instru-ments, carpets, and tobacco. Pop. (1900) 17,531.

Marcabrun (c. 1100), Provençal troubadour, born in Gascony. Some of his poems deal with the expeditions of Alfonso VII. of Castile against the Saracens (11.35-47). His style is often very difficult. See Diez's Leben und Werke der Troub. (2nd ed.,

pp. 37-45).

Marcantonio, or M. RAIMONDI (c. 1488-c. 1534), Italian engraver, born at Bologna. He copied Albert Dürer's works, which he sold as his own. He afterwards became acquainted with Raphael and Giulio Romano, who employed him to engrave their works. See *Life* in French by Delaborde (1887).

Marcasite, one of the sulphides of iron (FeS2), occurs as a mineral, and has the same chemical composition as pyrites. It forms nodules, films, incrustations, and irregular masses (sp. gr. 4.65 - 4.9, h = 6 - 65), very often in coals, clays, and other sedimentary rocks. It is used in the manufacture of sulphur and of sul-

phuric acid.

Marceau, François Séverin Desgraviers (1769-93), French soldier, born at Chartres, com-manded in the Vendean war (1793), took Koblenz in 1794, and operated with Jourdan in 1796 in the blockade of Mainz. He received his death wound at Altenkirchen, and died a prisoner in the hands of the Austrians. See

Life by T. G. Johnson (1896).

Marcello, Benedetto (16861739), Venetian poet and musician, was one of the most original composers of his day, and his musical settings of Paraphrases of the Psalms (1724-7) are amongst the grandest compositions of sacred music. He also wrote cantatas, oratorios, and concertos. See *Life* by Boito, in Great Musicians Series (1881).

Marcellus, at ancient Rome a family of the Claudian clan. (1.) MARCUS CLAUDIUS MARCEL-LUS was five times consul; in his first consulship, in 222 B.C., in a battle against the Insubrian Gauls, he himself killed their king, Britomartus or Viridomarus, and so won the spolia opima for the third and last time in Roman history. He was a leading general in the second Punic war; his chief success was the capture of Syracuse in 212 B.C. In 208 he fell in a skirmish against Hannibal. (2.) MARCUS CLAUDIUS MARCELLUS was born in 43 B.C., adopted by his uncle, the Emperor Augustus, who gave him his daughter Julia in marriage, and intended to make him his successor; but he died in 23 B.C. Virgil has immortalized him (*Encid*, vi. 860-886).

Marcet, JANE (1769-1858), authoress, born at Geneva, married (1799) Alexander Marcet, a lecturer at Guy's Hospital, Lon-don. Besides Storics for Young Children (1831), she wrote instructive books for the young, all exceedingly popular, the best known being Conversations on Political Economy (1816), On Chemistry (16th ed., 1853), and On Natural Philosophy (1819).

March. See YEAR. March, in music, a form of composition which must have a well-defined rhythm, and is usually written in common time. The famous Welsh war-song, The March of the Men of Harlech (1468), is believed to be the earliest known example. The military march, as a harmonized composition, dates from the middle of the 17th century. In all military marches the drum plays an important part.

March. (I.) Market town, Isle of Ely, Cambridgeshire, England, on the Nen, 7 m. s.s.w. of Wisbech, has the Gothic church of St. Wendreda, carries on engineering, and makes agricultural implements. Pop. (1901) 7,565. (2.) Or MORAVA, riv., Moravia, Austria, rises in the Sudetic Mts., on the boundary of Silesia, and flows S., forming the boundary between Austria and Hungary, and falls into the Danube 26 m. Length, 210 m.; E. of Vienna. navigable 50 m.

March, AGNES, COUNTESS OF.

See BLACK AGNES.

March, Auzias or Augustin (d. 1459), Spanish poet, was born in Valencia. Like Petrarch, of whom he was a student, he wrote in the Catalan dialect poetry of great freshness and beauty-e.g. Cants d'Amor, Cants de Mort, Cants morals, and Cant espiritual. His influence on Spanish poetry was great.

Marchand, Major. See Fa-SHODA.

Marchantia, a genus of liverworts, of which a common species, M. polymorpha, is often found on moist earth and damp walls. The flat thallus is often about four inches long, and from it arise special shoots which bear the antheridial shields on the upper side, and the archegonial stars on the under side, cither on shoots of the same or different plants.

Marchena, tn., prov. Seville, Spain, 30 m. E. of Seville, is a picturesque old town with Moorish fortifications. It is noted for its sulphur springs. Pop. (1900)

12,468.

Marches, RIDING THE. See

BOUNDS, BEATING THE.

Marches, dist. of Italy, including provs. of Ancona, Ascoli Piceno, Macerata, and Pessaro e Urbino. The principal products are maize, wine, and tobacco. It manufactures silk, straw-plait, and paper. Area, 3,797 sq. m. Pop. (1901) 1,064,749.

Marchesi, Blanche, or Ba-RONNE A. CACCAMISI, French singer, was born in Paris; sang first in Berlin (1895); appeared in the Walkyre at Prague (1900); made her debut in England with the Moody-Manners Company at Liverpool; and sang at Covent Garden in 1902-3.

Marchetti, Filippo (1835), Italian musical composer, born at Rome; president of the St. Cecilia Academy in Rome. brought out his first opera, Gentile di Varano, at Turin in 1856. His chief operas are Il Paria; Romeoe Giulietta (1865), produced at Milan; Ruy Blas (1869); Gustave Wasa (1875); and Don Giovanni d'Austria (1881).

Marchfeld, plain, N. of Danube, opposite Vienna. Here, in 1260, Ottokar of Bavaria defeated Bela IV. of Hungary, and in 1278 was himself defeated by Rudolph of Hapsburg. In 1809 the battles of Aspern and Wagram were fought here.

Marchienne-au-Pont, tn., prov. Hainault, Belgium, on riv. Sambre, 2 m. w. of Charleroi, amid coal fields. Pop. (1900) 18,938

Marching Order, the dress prescribed to be worn by troops when serving in the field, undergoing training, on manœuvres, and on field days, and when marching, undergoing inspection, or changing stations. For the men it consists of the No. 2 service dress, with forage caps and covers, or the helmet without plumes, and the full equipment, including haversack, ammunition pouches, cross belts, water bottle, etc. Officers in marching order wear their undress uniforms and patrol jackets.

Marcianise, tn., prov. Caserta, Italy, 18 m. N. of Naples; trades in fruits and grain. Pop. (1901)

12.891.

Marcion, a heretic of the 2nd century, whose doctrine was largely tinged with Gnosticism, was a native of Sinope in Pontus. He came to Rome and turned Christian, but soon thereafter, under the influence of the Gnostic Cerdo, renounced the current views of the church. Marcion held that the gospel was something entirely new, the absolute antithesis of the old order, unprepared for either by law or prophet; and that it was Christ's special task to undo the work of the lower divinity of the Jewsi.e. Judaism—and all the works of its God. Marcion's followers were required to abstain from wine, flesh, and marriage. As a basis for theology he drew up a canon of Scripture, embracing only ten epistles of Paul; he also accepted a gospel which bore the name of Luke: but these he purged from all that traversed his views. He had a considerable following, but the sect seems to have ultimately merged into Manichæism in the 6th century. See works by Hahn, Harnack (in Hist. of Dogma), and Lipsius.

Marcomanni, Germanic tribe

Marcomanni, Germanic tribe who originally dwelt between the Rhine and the Danube; but they expelled the Boii from Bohemia and part of Bavaria early in the Christian era, and founded a kingdom which reached to the Danube. During the reign of Marcus Aurolius (161 to 180 A.D.) they waged war with Rome, until peace was purchased by Commodus.



Guglielmo Marconi.
(Photo by 'The Biograph Studio,' London.)

Marconi, GUGLIELMO (1874), Italian electrical engineer, was lorn at Griffone, near Bologna, his mother being an Irishwoman. His first experiments in wireless telegraphy were made in Italy in 1895, then put to practical use in England in 1896. In 1899 he established connection by the same means across the English Channel, in 1901 between Corn-wall and Newfoundland, and in 1902 between Canada and Newfoundland. In 1904 he entered into an agreement with the British post office for the commercial transmission of wireless messages; and in the same year, through the same means, the first ocean daily newspaper was started on the ships of the Cunard line. system is in use in the British, Italian, and other navies, and on over seventy steamships of the mercantile marine.

Marco Polo. See Polo.
Marcus Aurelius. See Aure-

Marcy, Mount. See Adiron-

Mardin, tn., vilayet Diarbekir. Asiatic Turkey, 5 m. s.e. of Diarbekir, on slopes of Mardin Hills. It is the seat of an American mis-

sion. Pop. 12,000.

Mardonius, Persian noble, sonin-law of Darius. In 492 B.C. he commanded an expedition against Athens and Eretria; but the land army was cut up by a Thracian tribe. In 480 he shared in the expedition against Greece. After Xerxes' retirement he commanded the Persian army loft in Greece, which captured Athens a second time in 479 B.C., but which was destroyed at Platæa in the same year, he himself being slain.

Maremma, marshy region, Tuscany, Italy, extending from Orbetello to Piombino, and stretching from 15 to 20 m. inland. In olden times it was densely peopled, but is now almost a desert. See Ouida's In Maremma (1882).

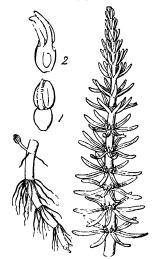
Marengo, vil., near Alessandria, Italy. Here Napoleon, on June 14, 1800, completely defeated the Austrians under Melas.

Marenzio, Luca (1560-99), Italian musical composer, born at Coccaglio, near Brescia; became maestro to Cardinal d'Esto, then to Sigismund III. of Poland, and finally organist to the Pope's chapel in Rome. He perfected the madrigal, and his compositions suggest the spirit of modern tonality by their chromatic modulations.

Mareotis Lake. See Mariut, Birket-el.

Mare's-tail, or HIPPURIS, a genus of aquatic herbaceous plants, belonging to the order Haloragaceæ. H. vulgaris, the common mare's-tail, is a native of Britain, where it is fairly common in stagnant water. It has simple, erect, jointed stems, with whorls of about ten linear strap-shaped leaves, with hard tips; and bears in summer inconspicuous greenish flowers, which are sessile in the axils

of the upper leaves. It is easily grown in the bog garden.



Common Mare's-tail, 1, Flower; 2, do., section.

Marcuil, Arnaut de. See Arnaut.

Marey, ETIENNE JULES (1830-1904), French physiologist, was born at Beaune (Côte d'Or); became in 1869 professor at the Collège de France in Paris. He was a successful deviser of means for measuring physiological movements, such as the sphygmograph. See his Des Mouvements des Fonctions de la Vie (1868), and La Méthode Graphique dans les Sciences Expérimentales (1878-84); Physiologic du Mouvement — Le Vol des Oiseaux (1890); Le Mouvement (1894); and La Chronophotographie (1899).

Margaret (1353-1412), queen of Denmark, Sweden, and Norway, daughter of Valdemar IV. of Denmark; married (1363) Haco VII. of Norway, whom she succeeded in 1380, while the death of her son Olaf in 1387 put her in possession of the Danish crown also. She then assisted the Swedes to expel their unpopular king, Albert of Mecklenburg; was elected queen; and in 1397 united all three kingdoms into one monarchy by the union of Kolmar. She was called the Semiramis of the North.

Margaret of Anjou (1430-82), queen consort of Henry VI. of England, daughter of René of Anjou. Owing to Henry's imbecility, Margaret's authority was supreme. She strove to uphold the rights of her son Edward in the wars of the Roses, until captured at Tewkesbury (1471). She was ransomed by Louis XI., and died near Saumur in Anjou.

Margaret of Navarre (1492-1549), was born in Angoulême. the daughter of Charles of Orleans, and was married in 1509 to the Duke of Alencon, and, after his death in 1525, to Henri d'Albert, king of Navarre. She was a patroness of science and arts, and exercised her influence in favour of toleration. Her literary fame rests on the Heptaméron des Nouvelles, which is modelled after the Decameron of Boccaccio. The book is a remarkable combination of religious mysticism and daring expression on questions of morals (new Eng. trans, by J. S. Charters, 1894; and by W. M. Thomson, 1896).

Margaret of PARMA (1522-86), a natural daughter of the Emperor Charles v.; was married first to Alexander de' Medici, and later (1538) to Octavio Farnese, Duke of Parma. She was created governor of the Netherlands (1559-67), but her severity drove them

into rebellion.

Margaret of Valois (1553-1615), a daughter of Henry II. of France and Catherine de' Medici. was in 1572 married to Henry of Navarre, who afterwards became Henry IV. of France, and was divorced from him in 1599. She was the last of the house of Valois, and the writer of Mémoires (1628;

new ed. 1872).

Margaret, Sr. (?1045 93), queen of Scotland, born in Hungary, the daughter of Edward the Exile of England; married the Scottish king, Malcolm Canmore (c. 1067), and died in Edinburgh Castle. Margaret did much to civilize Scotland by introducing various religious customs, the observance of Sunday, and stricter marriage laws; while her charity to the poor was unbounded. She was canonized (1250). Her head, removed to Douay, was lost during the French revolution; her remaining relics are said to have been enshrined in the Escorial by Philip II. Her Gospel Book is in

the Bodleian Library.

Margaret Tudor (1489-1541),
daughter of Henry VII. of England, born at Westminster; was married to James IV. of Scotland After his death at Flodden (1513), she married Archibald Douglas, sixth Earl of Angus (1514), and unsuccessfully strove to oppose the regent, the Duke of Albany. She divorced Angus (1527) and married Henry Stewart (1528), who was created Lord

Methven by James v.

Margarine, known also as OLEO-MARGARINE and BUTTER-INE, is a substitute for butter, first manufactured in 1870 in France by its inventor, Mège-Mouriès. The process is as fol-lows:—The best beef fat is washed in cold water and melted in a steam pan at a temperature of

77° c., the melted fat being run off and slowly cooled. The quality of the product depends in great measure on the care exercised at this stage of the process. The semi-solid fat is subjected to pressure, and the expressed liquid fat ('oleo'-margarine) is mixed with cotton-seed, cocoanut, and other oils, churned with milk and colouring matter, and after salting and working on a butter table is ready for sale. The main difference between butter and margarine is that in butter fat there is a relatively large percentage of soluble and volatile fatty acids, but in butterine or margarine these are practically absent.

Margarita, isl. in Caribbean Sea, off coast of Venezuela, 40 m. long; it rises in the E. to 3,240 ft.

Pop. 40,000.

Margary, Augustus Raymond (1846-75), Anglo-Indian traveller, born at Belgaum, Bombay Presidency, India; proceeded to China as student interpreter (1867), and travelled overland through S.W. China from Hankow to Bhamo (1874), and was murdered at Manwyn, on the Chinese frontier. His Journals were published in 1876.

Margate, munic. bor., wat .pl., and seapt., Isle of Thanet, Kent, England, 4 m. N.N.W. of Ramsgate; has a sea-front of nearly three miles, and is noted for its health-restoring air. Steamers run from Margate to France, Belgium, London, and other neighbouring ports. Noteworthy institutions are the Royal Sea-Bathing Hospital (1796), and the Deaf and Dumb Asylum. Adjacent to Cliftonville, the fashionable quarter, is Dane Park, opened 1898. The Grotto is a curious artificial cave adorned with shell mosaics, discovered in

1837. Pop (1901) 23,057.

Margaux, tn., dep. Gironde,
France, 15 m. N.W. of Bordeaux, is noted for its Medoc wines. Pop.

(1901) 1.757.

Margay (Felis tigrina), a small carnivore with a spotted coat. It inhabits forest regions from Mexico to Paraguay. with tail, 3 ft. Length,

Marggraf, Andreas Sigismund (1709-82), German chemist, born at Berlin; head of the chemical side of the Academy of Sciences there; noteworthy for his researches on phosphoric acid, and for his discovery of cane sugar in bectroot. He wrote Chymische Untersuchungen (1757) and Chymische Schriften (1761-7).

Margilan, or MARGHILAN, tn. Russian Central Asia, cap. of Ferghana prov., 150 m. s.e. of Tashkend. Nine miles from Old Margilan the Russians have constructed the new (European) city of Novo-Margilan. Market-gar-dening flourishes, and camel'shair, woollen, and silk stuffs are made. Pop. (1897) 36,592.

Margin, a term used in monetary transactions to indicate the difference between the market value of the securities deposited to cover a loan and the actual advance made. This difference is to allow for possible depreciation of the securities deposited, and the amount of it will depend on the nature of the securities and on their general liability to sudden fluctuations without warning. The margin exacted by bankers in the ordinary course of business varies from 10 to 25 per cent. By an extension of this practice a very great deal of purely speculative business is done, but usually by brokers outside the regular stock exchange. A deposit of from 5 to 10 per cent. is made by the speculator upon margins with his broker. Should the security selected depreciate more than this amount, the transaction is closed till a new deposit is made. Should the security rise in value, the speculator receives the difference after deducting the commission. This kind of speculation easily lends itself to dishonesty, and becomes simply gambling, with the odds heavily against the speculator. The places where such transactions are carried on are called 'bucket shops.

Margrave, originally the governor of a march or frontier district, such as the Germans held against the Slavs and the Magyars. These officers were first appointed in the time of Charles the Great, but eventually the title was divorced from the office and

became a title merely.

See CHRYSAN-Marguerite. THEMUM.

Margyricarpus, a genus of shrubs belonging to the order Rosaceæ. They bear small, solitary, sessile flowers, followed by bright white fruits, whence the popular name of pearl fruit. sctosus, a little evergreen shrub from the Andes, is a hardy rockery plant, liking a well-drained soil that contains leaf - mould. grows three feet in height, and has imparipinnate leaves.

Marheineke, PHILIPP KONRAD (1780-1846), German theologian, was born at Hildesheim, Hanover; was professor at Erlangen (1805), Heidelberg (1807), and Berlin (1811), where he was the colleague of Schleiermacher, Neander, and Hegel. His dogmatic system, set forth in Die Grundlehren der Christlichen Dogmatik als Wissenschaft (1819), is a recast of Christian facts and doctrines in the mould of the Hegelian logicpantheism masquerading as Chris-Other works are Getianity. schichte des Christlichen Moral (1806), System des Catholicismus (1810-13), Geschichte der Deutschen Reformation (1816; 2nd ed. 1831-4), System der Theol. Moral (1847), Vorlesungen über die Theologische Moral, Dogmatik, Symbolik, und Pogmengeschichte (1847-9).

Maria Christina (1806-78), queen of Spain, was the daughter of Francis I. of Naples, and in 1829 was married to Ferdinand vII. of Spain. After his death, in 1833, she ruled as regent for her daughter Isabella, but resigned in 1840 in consequence of popular disturbances aroused by the Car-

Maria Christina, queen and queen regent of Spain (1858), was born of the Austrian royal family, and was married to Alfonso XII. of Spain. During the minority of her son, who became king in 1902 as Alfonso XIII., she was queen-regent.

lists

Mariana, JUAN (1536-1624), Spanish historian, born at Talavera. He became a Jesuit, and studied and taught in Italy and France until 1574, and passed the rest of his life at Tolcio. His History of Spain was published in Latin (1592), and in Castilian (1601). The style is fresh and charming and the work recombined charming, and the work remains a classic, though minute exactness is not claimed for it. His other works include De Rege, a treatise on monarchy (1599), which, however, was condemned and burnt in 1611. The author was imprisoned on account of other essays, and of his attitude towards the Society of Jesus, from which he was expelled. See Garzon's El Padre Mariana (1888) and G. Cirot's Etudes sur l'Historiographie Espagnole - Mariana Historien (1905).

Marianthus, a genus of Australian twining or procumbent shrubs belonging to the order Pittosporaceæ, bearing panicles of blue, white, or pink flowers, followed by capsular fruit. They are easily grown as trellis plants in greenhouses, a light peaty soil being the suitable compost.

Maria Theresa (1717-80),

queen of Hungary and German empress, was daughter of Charles VI., and was born at Vienna. For nearly thirty years (1713 40) it was her father's endeavour to secure for her, as he did by the Pragmatic Sanction, the right of succession to the imperial crown. She married Francis of Lorraine, whom, when crowned herself at Presburg (1741), she nominated joint-regent with herself. Her succession was at once challenged by Charles Albert of Bavaria, supported by the French, by the elector of Saxony, and by the kings of Prussia, Spain, and Sardinia. On the success of Charles, who was proclaimed emperor (1742) as Charles VII., she took refuge in Hungary, and the

Magyars helped her to win back her crown (1748). Silesia, however, during the struggle (1742) was taken by the Prussians, and this gave rise fourteen years later to the Seven Years' war. (See Austria and Prussia.) In 1772 Poland was partitioned by Catherine II. of Russia, Frederick of Prussia, and Maria Theresa, who acquired Red Russia (Galicia). Between 1777-9 she engaged in another war with Prussia. After 1763 the empress instituted many reforms in army, justice, and education; opened to trade the ports of Trieste and Fiume, assigning the latter to Hungary; expelled the Jesuits, and confiscated much church property; and abolished legal torture. With much of her later policy Count von Kaunitz is associated. She was the mother of the emperors Joseph II. and Leopold II., and of Marie Antoinette. See Arneth's Geschichte Maria Theresia (10 vols. 1863-79); De Villermont's Maria Theresia (1905).

Maria Theresiopel Se

Mariazell, tn., duchy of Styria, Austria, 60 m. s.w. of Vienna, has a shrine of the Virgin, which attracts 200,000 pilgrims annually. Pop. (1901) 1,341.

Marica, a genus of tropical herbaceous plants belonging to the order Iridaece. They have short rhizomes, coriaceous leaves, and six-partite perianths. Some of the species make desirable plants for glass-house cultivation.

Marie Antoinette, Joseph Jeanne (1753-93), queen of France, wife of Louis XVI., daugh-ter of Francis I. and Maria Theresa, was born at Vienna, November 2, the day of the Lisbon earthquake. Becoming queen of France in 1774, her influence over Louis XVI, was great but profitless; she thwarted him in his wish to yield reform, and urged him to absolutism. She was blamed for the extravagance of her predecessors as well as for her own. Disliked by the courtiers, hated for her favours to the Princess Lamballe (whose head was flourished before her prison window) and the Duchess de Polignac, held responsible for dismissing Turgot and Necker and summoning Loménie de Brienne and Calonne to office, basely besmirched in reputation and stung at heart by the affair of the diamond necklace (1785), she by her unpopularity helped to ruin the royal cause. Still she faced the mob of women at Versailles (October 5 and 6) with splendid courage; and after the flight to Varennes (1791) she accompanied Louis to the Assembly, and later to the Temple, where her fortitude and patience equalled her previous bravery. Accused before the revolutionary tribunal of intriguing with the enemies of France and of stirring up civil war, she was condemned and executed (October 16, 1793). See Histoire de Marie Antoinette, by Rocheterie (ed. 1995); Marie Antoinette, by Tschudi (1902); Gower's Last Days of Mary Antoinette (1885); Carlyle's French Revolution and The Diamond Neckluce; Mémoires, by Madame Campan (ed. 1*91); and M. Antoinette by Pierre de Nolhac (ed. 1898).

Marie de France, Anglo-Norman poetess of the 12th century. Her works include a collection of Breton Lais, and translations of The Fables of Asop and the Purgatory of St. Patrick. She appears to have spent much of her life in England. Marie's style is graceful, and she tells her story with a charming ease and simplicity. See Lais Marie de France (ed. D. Warnke, 1901) and Fables (ed. D. Warnke, 1898); Poésies de Marie de France (1820, includes the Fables); Lais Inédites, by Gaston Paris, in Romania VIII. ; Lais of Marie de France (Eng. trans. by Edith Rickert, 1901); Four Lais of Marie de France and Others, by J. L. Weston (1900, being No. 3 of Arthurian Romances), contains lais not included in above; The Lay of Guingamor (1897) and The Lays of Gratent and Lanval (1900), both by Dr. W. H. Schofield.

Marie de' Medici (1573-1642), daughter of Francis, grand-duke of Tuscany, married (1600) Henry IV. of France. After the murder of her husband by Ravaillac, she was appointed queen-regent, but allowed herself to be governed by two Florentine adventurers, Concini and his wife Leonorth, until the young king, Louis XIII., caused Concini to be assassinated, and exiled Mary to Blois, whence she made her escape to Angoulème in 1617. After endeavouring to stir up civil war against her son, she fied to Brussels in 1631, and was for a time resident in England with her daughter Henrietta Maria, wife of Charles I. She died at Cologne. See Life by Pardoe (ed. 1902) and The Regency of Marie de Medicis (1904).

Marienbad, wat.-pl. (since 1808), Bohemia, Austria, 40 m. N.W. of Pilsen. Its springs vary in temperature from 48° to 53°. Salt and mineral waters are exported. It has been frequently visited for the 'cure' by King Edward vil. Pop. (1900) 4,588.

Marienberg, tn., Saxony, Germany, 16 m. s.e. of Chemnitz, has manufactures of lace and toys, and silver mines. Pop. (1900) 7.108.

Marienburg, tn., prov. W. Prussia, Prussia, 27 m. s.e. of Danzig. Its fine castle, dating from the 14th century, was the seat of the grand master of the Teutonic order, and belonged to the Teutonic knights until 1457. The town has manufactures of pottery and machinery, saw-mills, flour mills, and cotton factories. Pop. (1900) 10,735. Marienwerder, tn., prov. W.

Prussia, Prussia, near r. bk. of Vistula, 42 m. s. of Danzig, was founded in 1233 by the Teutonic knights. It has a 13th century cathedral; also iron foundries, saw mills, and machinery workshops. Pop. (1900) 9,686.

Marietta, city, Ohio, U.S.A., co. seat of Washington co., on the Ohio, in a petroleum, coal, and iron region. Here is Mariette College (1835). Pop. (1900) 13,348.

Mariette, François Auguste Ferdinand (1821-81), French Egyptologist, was born at Boulogne. In 1850 he was sent to Cairo in search of Coptic Mss. He then discovered the Serapeum at Memphis, and, as keeper (1858-63) of monuments to the Egyptian government, devoted his energies to archæological exploration. He dug out the Sphinx, and excavated Meydun, Gizeh, Abydos, Karnak, etc., and began the excavation of Tanis. He founded in 1863 the Bulak Museum near Cairo, and the Egyptian Institute, and published books on Le Sérapéum de Memphis (1857-66); Abydos (1870-80); Dendérah (1870-80); Karnak (1875); Deir el - Bahari (1877); Monuments Divers (1872-89); and on papyri. See E. Mariette's Mariette Pucha (1904) and Maspero's Notice Biographique sur Auguste Mariette (1904). In English have appeared Monuments of Upper Egypt (1877) and Outlines of Ancient Egyptian History (1890).

Marigliano, tn., prov. Caserta, Campania, Italy, 12 m. E.N.E. of Naples. Pop. (1901) 12,452, Marignac, JEAN CHARLES GALISSARD DE (1817-94), French chemist, was born at Geneva, and worked with Liebig at Giessen in 1840. Shortly afterwards sen in 1840. Shortly afterwards he became professor at Geneva (till 1878). His principal work included highly accurate determinations of the atomic weights of several of the elements; researches on the rare earths, during which he discovered ytterbium and gadolinium; and important investigations, mostly thermo-chemical, as to the nature of solution.

Marignano. See MELEGNANO. Marigold, a name given to several quite distinct flowering plants. The marsh marigold, which produces its handsome rich yellow cups in early summer, is Caltha palustris. The corn mari-

gold is the yellow oxeve, Chrysanthemum segetum, which flowers in summer and autumn. The halfhardy French and African marigolds of gardens are varieties of certain species of the genus Tagetes. The old marigold, or marygold of English poets and herbalists, is a hardy annual plant, Calendula officinalis. 1ts habit of opening or shutting its flowers as the sun shines or not has long afforded similes to moralists and poets. Formerly the flowers of the marigold were much used in the dried state as a flavouring for soups, and in possets, broths, and drinks. Marigold flowers were also used for salads and for healing woundsc.g. in the American civil war.

Marinating, the process of soaking fish or meat, previous to cooking it, in a sort of flavouring pickle made by mixing three tablespoonfuls of vinegar to two of oil, one tablespoonful of salt, one quarter-teaspoonful of pepper, one bay-leaf, one teaspoonful onion juice, and a sprig of parsley.

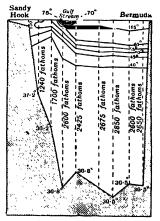
Marinduque, isl. of Philippines, between Luzon and Mindoro. Area, 667 sq. m. Chief tn. Boac (pop. 14,722). Pop. of isl. 48,000.

Marine Biological Research. Of the expeditions specially sent out for deep-sea research one of the earliest was that of the Challenger (1873-6), under Sir Wyville Thomson. Great attention has been given to scientific investigations connected with fisheries, especially by the United States Fish Commission, the German Commission at Kiel, and the Scottish Fishery Board. At the present time al-most every maritime country has one or more laboratories, and many of them have a speciallyequipped vessel, engaged in this work. Within the last few years an international commission for the scientific exploration of the sea in the interests of the fisheries has been appointed, all the mari-time countries of Western Europe, except France, being represented, and a large staff of scientists are engaged in this work, from the White Sea to Iceland, and down to the English Channel.

The objects of marine biological research are twofold—(1) to increase our knowledge of the natural history of living beings; and (2) to ascertain the conditions which influence the sca fisheries. In fisheries research, attention is mainly directed to the natural history of fishes, their migrations, reproduction, food, growth, the nature of their eggs, and the causes of fluctuations in their abundance. In both branches of research the physical phenomena of the sea, such as depth, temperature, currents, salinity,

which influence marine life, are also studied: this branch is termed hydrography.

The organisms in the sea are collected for study in a variety of ways. Fishing apparatus of all kinds are used, especially trawls and dredges, but also traps, and 'tangles' of teased rope to which rough or spiny forms on the bottom adhere; while the organisms that float in the water are obtained by townets, of gauze or fine netting, dragged after the boat. Some of these are 'closing' nets, so arranged that they may be made to fish at a particular depth. Soundings to determine the depth are made with greatly improved apparatus, piano wire taking the place of the hempen rope that used to be employed. The heavy sinker is detached mechanically, and left on the



Temperature Curves for part of the North Atlantic.

bottom if the depth is great; and with the aid of steam reels the greatest depth of the sea can now be accurately ascertained in an hour or two. While the average depth of the sea is a little over two miles—and the sea covers about three-quarters of the surface of the globe—the greatest depth ascertained is 31,614 ft., or nearly 6 m., found near one of the Ladrone Islands, in the N. Pacific. Depths almost as great have been discovered off New Zealand and Japan; while, in the Atlantic, the deepest sounding taken was 27,366 ft., off Puerto Rico. From the peak of the highest mountain to the greatest depth in the sea the vertical distance is over 10 m.

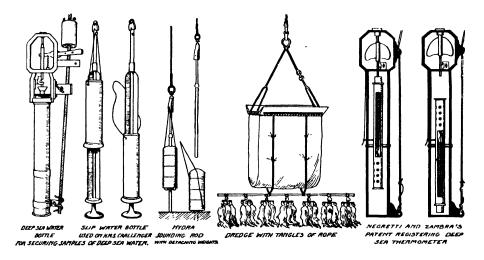
Surface temperature may be readily determined by an or-dinary thermometer; but below the surface specially-constructed thermometers are employed, designed (1) to resist the pressure of the water, which is enormous in the great depths, amounting to about one ton per square inch for every thousand fathoms; and (2) to automatically register the temperature. A sample of the water is also brought up for chemical analysis. All these operations may be accomplished at a single sounding, together with another, viz. the bringing up of a sample of the ooze or deposit on the bottom for investigation. Currents are determined (1) by current meters, maintained in a fixed position, though often they cannot be employed; (2) by the use of floats, usually bottles, containing information by which the place where they were cast away can be identified these are

'plankton,' as distinguished from the 'benthos,' or those living at the bottom. They are the cause of the phosphorescence so common at the surface. In some parts of the sea larger plants may exist in abundance, as in the Sargasso Sea, which occupies about three million square miles of the Atlantic.

The animals in the deep water—which forms by far the greater portion of the ocean—must therefore be carnivorous; and nearly all marine fishes are carnivorous. From the restricted penetration of light, it also follows that the deeper waters are cold compared with the surface. The temperature varies with the latitude and season as well as with the depth. In the Red Sea the temperature

tions on animal life is profound. Vegetation exhibits the same cycle of growth and decay; many animals migrate as the temperature varies, sometimes with as close a relation to the variation as is shown by migratory birds; the period of reproduction is determined, occurring in temperate latitudes in spring and summer, as with birds. Moreover, the growth of marine organisms is controlled by the temperature, varying with the seasons. Rings of summer growth may be seen on the shells of molluses, as on oysters, and on the bones and scales of fishes, just as they occur on the stems of trees.

In the abysses of the ocean, on the other hand, the water is



Apparatus for Marine Biological Research.

useful only for surface currents; (3) by a periodical study of the temperature and other physical properties of the water over an area and at different depths, by which the movements of large masses of water can be traced.

All animal life in the sea depends ultimately upon plants or vegetable life; but plants are scarcely represented beyond a depth of 50 fathoms, and they are quite absent below 200 fathoms. On the other hand, everywhere at the surface, over all the ocean, and within the limit of the lightzone, multitudes of minute plants exist, such as diatoms; these form the food, directly or indirectly, of the animal life which is present in the surface waters. These floating organisms, plants as well as animals, are known as

twenty feet below the surface may exceed 90° F. for several months in the year, and has an annual average of over 80° r.; in the British seas the annual average ranges about 50° F., and the maximum about 60° F.; while on shallow beaches it may vary from 90° F. in summer to freezing-point in winter. In the open sea, even in the tropics, the temperature a few hundred fathoms below the surface is greatly reduced, and is almost constant, while at the bottom it is always close to the freezing-point. This is owing to the fact that the cold water of the polar regions sinks down and creeps along the bottom towards the equator, while the warm surface water takes, in a general sense, the opposite direction. The influence of these condishrouded in perpetual night, is icily cold, and is almost absolutely still. Nevertheless, the depths of the sea are peopled with a rich variety of animal life—fishes, cchinoderms, molluses, crustaceans. The fishes, as a rule, are dark-coloured or quite black, but sometimes they are silvery; the invertebrates may be brilliantly coloured—red, yellow, purple, green, but never blue. Many of them are blind. The fishes living in the lesser depths, where a glimmering twilight may be supposed to prevail, have usually exceedingly large eyes—as with owls and nocturnal animals on land—but in the abysses the eyes are usually extremely small. The presence of eyes argues the existence of light, and a considerable proportion of

the deep-sea fishes are furnished with luminous phosphorescent organs by which they can manufacture light for themselves; some invertebrates are similarly endowed. These organs vary in form and position: commonly they are placed in rows along the lower half of the body, as if to illuminate the bottom: sometimes they exist as lamps on the front or sides of the head, and again at the end of waving filaments. Whether collectively they serve to illuminate the bottom waters appreciably, or simply produce a glow in the immediate neighbourhood of the animal possessing them, is a moot point. The fishes of the deep sea are also remarkable, as a rule, for the great relative size of their jaws and the formidable armature of teeth. None of large size have yet been brought up, probably because the nets or dredges used in the great depths must neces-sarily be small. The greatest depth at which animal life has been found is four and a half miles, in the S. Pacific.

Whether animal life exists in the great intermediate regions of the sea, between the sub-surface waters and the bottom, is not clearly proved. Investigations clearly proved. Investigations made by Agassiz in the Pacific with special nets gave negative results below 400 fathoms. See Challenger Expedition Reports

(1880-95).

Marine Engine. See STEAM-ENGINE, MARINE.

Marine Insurance. See In-SURANCE, and LLOYD'S.

Marines, troops raised for service on shipboard, the first being a body of 1,200 raised in 1664. The divisional system dates from 1755, when the Chatham, Portsmouth, and Plymouth divisions were established. From April 1802 they were styled the Royal Marines. In 1805 a fourth division was raised, that of Woolwich. For a long period, after 1760, all the superior officers of marines were naval officers. The posts were sinecures of considerable value, and the anomaly was not abolished until 1833.

The Royal Marine forces now consist of the Royal Marine Artillery (established as a sepamatrice (constitution of the Royal Marine Light Infantry (so called since 1855). The former have their depôt and headquarters at Eastney; the latter have their depôt at Deal, and headquarters at Chatham, Portsmouth, and Plymouth. The Woolwich discussion of the control o vision was abolished in 1869. For the entry of officers into the Royal Marine Artillery the regulations as to age and examination are the same as for the Royal Military Academy at Woolwich, where the examination is held.

For the Royal Marine Light Infantry the examination is the same as for Sandhurst. On being appointed a second-lieutenant in the marines, a candidate joins the Royal Naval College, Greenwich, for a course of two terms, at the end of which there is an examination. On successfully passing, a candidate is gazetted lieutenant. The strength of the Royal Marines for 1905 was 20,400. See Admiralty Instructions.

Marine Salvage. See SAL-

Marinette, city, Wisconsin, U.S.A., co. seat of Marinette co., on Green Bay, 145 m. N. of Milwaukec; has lumber trade. Pop. (1900) 16,195.

Marini, Giambattista (1569-1601)

Marini, Giambarrista (1995), Italian poet, was born at Naples; lived at the courts of Rome, Turin, and Paris, and died near Naples. All his poems lyric, idyllic, and epic—enjoyed extraordinary fame in Europe. There is no depth in any of them, but an excess of brilliant description of the obvious, clothed in a bombastic style. This cult was bombastic style. This cuit was termed Marinismo. The poet's chief work, the Adone (1623; ed. by F. d'Ambra, 1895), tells the story of Venus and Adonis. A short epic, the Strage degl' Innocenti, appeared in English as The Slaughter of the Innocents (1675). The Opere were edited by Ziardini (1861). See monographs by Menghini (1888), Panzacchi (1895), Borzelli (1898), and Damiani

Marino, tn., prov. Rome, Italy, on the Alban Hills, 15 m. s.E. of Rome; was a stronghold of the Orsini, then of the Colonna. It has a cathedral, and is noted for its wine. Pop. (1901) 7,307.

Mario, GIUSEPPE, MARQUIS OF CANDIA (1808-83), Italian tenor, was born at Cagliari. In the title-rôle of Robert le Diable (1838) he charmed the Parisians with his perfect voice, and the following year made his debut in London in Lucrezia Borgia. From 1842 to 1869 he sang principally in those two cities. He was an ideal stage-lover, and his voice was peculiarly velvety and soft. He married the singer Giulia Grisi.

Mariolatry, the worship of the Virgin Mary. We find Epi-phanius (4th century) combating the views of the Collyridians, an obscure Arabic sect who worshipped Mary; while the Nesto-rian movement was originally a protest against her being desig-nated the 'mother of God' (Theotokos). Augustine gave currency to the view that, while Mary partook of the general corruption of human nature, she was possibly free from actual sin; in the 9th century she is represented as the

queen of heaven; Aquinas speaks of her as 'all our hope of salva-tion;' and Bonaventura as 'the gate of heaven.' This view of her dignity and power has continued to grow, till at the present time her mediatorial place in the Roman Catholic Church has be-come all but supreme. The Immaculate Conception of Mary was in 1854 declared to be an article of faith by Pius IX. Mariolatry is condemned in the 22nd Article of the Church of England, and in the Westminster Confession, ch. xxi. 2. Catholics, however, are accustomed to rebut the reproaches of Protestants by drawing a distinction between divine worship and reverence, the latter of which only, it is alleged, is accorded to Mary, while the characteristic feature of the former is its being accompanied by sacrifice (the mass). The exalted conception of her character and authority is seen in the various festivals instituted in her honour-c.g. the Concepin normal c.y. the Conteption (December 8), the Presentation November 21), the Purification February 2), the Annunciation March 25), the Visitation (July 2), and the Assumption (August 15) 15), most of which are also observed by the Greek Church; as also in her prominence in ecclesiastical art; for example, in a Trastevere mosaic of the 12th century she is represented as enthroned, and equal to Christ. For literature, see MARY.

Marion. (1.) City, Indiana, U.S.A., co. seat of Grant co., 60 m. N.E. of Indianapolis. Pop. (1900) 17,337. (2.) City, Ohio, U.S.A., co. seat of Marion co., 40 m. N. of Columbus. Pop. (1900) 11,862.

Marionettes, originally little images of the Virgin, are jointed puppets worked by hidden actors in miniature theatres. The word in this sense occurs first in Guil-laume Boucher (1584). They are also known as fantoccini, and ombres chinoises form a variety. Figures with jointed limbs have been discovered in tombs in Egypt, where they were used in the feasts of Osiris. They were known in Etruria, Rome, Greece, India, Burma, China, and Java. Punch can be traced in the Roman Maccus and Persian Penj. In the middle ages they were employed to enact mystery and morality plays. Introduced from Italy to France (under Charles IX.), and thence to England, they are alluded to by Chaucer, Shakespeare, Jonson, Pope, The Tatter (1709), and Spectator (1711). Bartholomew Fair was famed for them, as, later, was Brone's Theatre of Arts (1830-40). In France they were exhibited at St. Germain (1595); and Pothin

and Jehan des Vignes (16th century), Brioché (1669), and Le Sage (1721) were connected with them as actors or authors. George Sand had a theatre for them at her castle of Nohant. Pupazzi, introduced by De Neuville (1863), revived interest in them at Paris, and marionette representations were given in the Théâtre du Chat Noir (1887-97) by Henri Rivière; and Ombres françaises were shown at the Petit Théâtre (1888-92) by Signoret. See Maindron's Marionettes et Guignols (1901), and Charles Magnin's L'Histoire des Marionettes (1862).

Mariotte, EDMK (1630-84), French physicist, was born in Burgundy, and was one of the first members of the Académie des Sciences, founded in Paris (1666). His most important work was an essay, De la Nature de l'Air (1679), which contains a state-ment of Boyle's law of gases, called by the French Mariotte's

law.

Maris, three Dutch painters, brothers-Matthijs (1835), Jacob (1837-99), and WILLEM (1844) whose work in landscape, founded on the Barbizon school, influenced largely the growth of the Glasgow school. Matthew is the poet dreaming in colour, whose work is among the most poetic, individual, and winnowed in contemporary art. Jacob, born at the Hague, is considered, in point of personality and expressional power, as regards the spirit of his day, as one of the greatest depicters of Dutch landscape and life since Rembrandt. His extraordinary talent was recognized in Britain and in France before he was appreciated in his own c untry. The museums at the Hague and Amsterdam have examples of his work. Willem is purely a landscape painter, who prefers luminous, cheerful aspects of nature. There is a Landscape with Cattle by him in the Hague museum. See monograph on Jacob Maris by T. de Bock (1904).

Marischal, EARL, a title created by James II. of Scotland, and conferred before July 4, 1458, on Sir William Keith, descended from a family which from the time of David I. possessed a portion of Keith in East Lothian, and from the beginning of the 18th century held the hereditary office of great marischal.—GEORGE, FIFTH EARL (1553-1623), defrayed all the expenses of the marriage in 1589 of James VI. to the Princess Anne of Denmark, and founded (1593) Marischal College, Aberdeen.-His grandson, WILLIAM, SEVENTH EARL (? 1617 1661), became the head of the northern Covenanters, and was very active against Huntly. But in 1650 he supported Charles 11.,

and being taken prisoner at Alyth (Aug. 26, 1651) was sent to the Tower. At the restoration he was appointed keeper of the great GEORGE, TENTH EARL (?1693-1778), fought on the side of the Chevalier at Sheriffmuir in 1715, and having escaped to the Continent, was attainted. In 1719, at the head of a small Spanish expedition, he landed in the western isles, and was defeated at the pass of Glenshiel. Escaping again to the Continent, he joined his brother, Marshal Keith, in Prussia, and served under Frederick the Great.

Marists, a modern French and Roman Catholic congregation, instituted as Marist Fathers in 1815, developing into Marist Brothers in 1817 and Marist

Sisters in 1834.

Maritime Alps, a portion of the Alps extending from the Col di Tenda (s.E.) to the Col de l'Argentière (N.W.). The chief peaks are the l'unta dell' Argentera (11,140 ft.), Cima dei Gelas (10,286 ft.), Monte Matto (10,128 ft.), Mont Enchastraye (9,695 tt.), and Mont Monnier (9,246 ft., with observatory). The principal passes are the Passo del Pagarin (9,236 ft.), the Col della Ciriegia or delle Cerese (8,370 ft.), and the Col delle Finestre (8,107 ft.), besides the carriage roads over the Col de la Cayolle (7,717 ft.), and the Col d'Allos (7,382 ft.), both leading from Nice to Bar-celonnette (Ubaye valley), the former by the Var and the latter by the Verdon valley. See John Ball's Alpine Guide (1898), and Garnier's Memoire sur les Alpes-Maritimes (1888).

Maritime Province, Siberia, extends from the Arctic Ocean to Korea, and inland to the range and the Us-Stanovoi suri R. The N. part is covered with forest or tundra, where a sparse population maintain themselves by fishing in summer and hunting in winter, or wander about with herds of reindeer. Furs, especially sables, constitute their tribute to the government, while fish constitute almost their only food. Many of the settled inhabitants are Russians or halfbreeds. The other inhabitants are Tunguses, Yakuts, Chukches, Koriaks, and Kamchadales (in Kamchatka). Coal is found. Coal is found. Gold is extracted on the Amgun R., and the lower Amur is colonized by Cossacks and Koreans. Cap. Vladivostok. Area, 715,960 sq. m. Pop. 228,824. Maritime Provinces, a

general name for the Canadian provinces on the Atlantic coastviz. Nova Scotia, New Brunswick, and Prince Edward Island.

Maritza (Lat. Hebrus), riv., European Turkey, riscs in the Rhodope Mts., flows E., then S.,

and falls into the Ægean Sea near Enos; 300 m. in length. It is navigable for small boats up to Adrianople, 100 m. from its mouth.

Mariupol, seapt. tn., Ekaterinoslav gov., S. Russia, on N. coast of Sea of Azov, and 60 m. W.S.W. of Taganrog. It exports cereals, linseed, skins, and tallow, to the value of over 11 millions ster-ling, and has flour mills, tan-neries, foundries, and agricultural implement works. Pop. (1897)

31,772. Marius, Gaius (155-86 B.c.), Roman general, was born at Arpinum; served under Scipio Africanus the younger at the siege of Numantia in 134 B.C.; and became tribune of the Commons in 119 B.C. In 115 he was prætor, and as proprætor the next year did good service in Spain. We next find him in Africa serving as legate under the Consul Metellus against Jugurtha. In 107 he was elected consul, and received the command in Africa. He ended the war by the capture of Jugurtha in 106. Next the threatened invasion of the Cimbri and Teutones caused him to be elected consul every year from 104 to 100 B.C. In 102 he destroyed the Teutones at the battle of Aquæ Sextiæ, and, in 101, annihilated the Cimbri on the Raudine plains. In 100, with Saturninus and Glaucia, Marius led an attempt at a democratic reform; but failed in nerve at the last moment, and actually used his troops against his own friends. Henceforth his importance was gone, though he did command an army with some credit in the social war of 90 B.C., and appeared as a popular leader in the civil troubles of 88 B.C.; but Sulla's seizure of Rome caused him to flee for his life. On Sulla's departure for Asia, the democratic party gained the upper hand: Cinna and Marius entered Rome, and massacred every noble who fell into their hands. Marius was elected consul for the seventh time for 86 B.C. Marius was a soldier of great experience, tactical skill, and sound discipline, but no genius. He converted the Roman army from a citizen into a professional force, and made it the instrument of its general. He was excessively superstitious, being always attended by soothsayers.

Mariut, BIRKET-EL-, MARE-OTIS, or MAREIA, lagoon, Lower Egypt, separated from the Mediterranean by a narrow ridge of sand on which stands Alexandria. At the end of the 18th century the lagoon was nearly dry; in 1801 breaches were made for the sea to enter. Length, 28 m.;

breadth, 20 m.

Marivaux, Pierre Carlet de CHAMBLAIN DE (1688-1763), French man of letters, was born at Paris. His first book was a parody on the *Iliad*, but it was as a writer of light comedy, and, above all, as the writer of Marianne, a highly-esteemed romance, that his fame was made. Voltaire's epigram that he knew all the bypaths of the human heart, but not the highway, is a searching criticism. The stronger passions have no meaning for him, and he writes away in an atmosphere of moral dilettanteism, of which his 'precious' and somewhat finical style is simply an illustration. His Œuvres Complètes were published in 10 vols. (1827-30). See Lives, in French, by Fleury (1881), Larroumet (1894), and Deschamps (1897).



Marjoram (Origanum onites). 1, Flower spike; 2, corolla; 3, calyx, front.

Marjoram, a name given to certain herbs belonging to the genus Origanum. The two species commonly cultivated are O. marjorana, the sweet marjoram, and O. onites, the pot marjoram. They are generally grown as annuals, being sown in a warm situation in April, and the plants thinned to nine inches apart. The tops are cut in July as they begin to flower, and are dried in the shade for winter use. A light soil

is preferable.

Mark, the standard of value and the money of account in the German empire, where the gold mark was adopted in 1873 as the unit of currency. It is the equivalent of 11.747 English pence, and is divided into 100 pfennige. The gold coin of lowest denomination is the 5-mark piece. metallic currency consists of 20mark pieces, 10-mark pieces, and 5-mark pieces, with a subsidiary token coinage of silver consisting of 5, 2, 1, 1, 1 marks. The mark

was also an Anglo-Saxon money of account. Its original value was equivalent to 100 pennies, but in the 12th century it had appreciated to 160 (13s. 4d.).

Mark, THE GOSPEL ACCORDING To, the second book of the New Testament. It makes more of the acts of Jesus than of His utterances, and contains numerous miracles; and though most of its material is found in one or more of the other gospels, its terse diction and vivid and realistic narrative give it a unique character and value. The existence of the gospel is well authenticated from the time of Ireneus, and an indisputably primitive tradition connects it with the names of Peter and Mark, the latter of whom, according to Papias, was the interpreter, or perhaps amanuensis, of the apostle, and com-posed his memoirs (so Justin and Irenœus) in the second gospel. The Tübingen school regarded it as a 'tendency-writing,' adapted from both Matthew and Luke in such a way as to repress everything that could offend either of the two parties (Jewish and Gentile Christians) within the church, and published, moreover, under the name of Mark, who was a companion of both Peter and Paul. More recent and less theory-ridden criticism, however, has assigned to the second gospel the primary place, so that Mark is now regarded as the main source of the narrative portions of Matthew and Luke. Holtz-mann, indeed, originally held the hypothesis of an *Ur-Markus*, a primitive written gospel of which the present Mark was a recast; but his abandonment of the theory (in his Einleitung, 3rd ed.) has done much to secure the gospel its high place in the literature of Christianity as a genuine work of the 1st century (before 70 A.D.). See Gospels, and commentaries by Alford, Morrison, Meyer, Cook (Speaker's), Holtzmann (Hand-Com.), Maclear (Camb. Bible), Bruce (Expos. Greek Test.), Gould Intern. Crit. Com.), and Salmond (Cent. Bible).

Mark, or JOHN MARK, a companion of the apostle Paul, and believed to be the writer of the second gospel. He was the cousin of Barnabas (Col. 4:10), and the house of his mother Mary in Jerusalem seems to have been a resort of the disciples of Jesus (Acts 12:12 ff.). He accompanied Paul and Barnabas on their first missionary journey as far as Perga in Pamphylia (Acts 12:25), but here he left them, and returned home (13:13). When, however, Barnabas proposed to take Mark on the second journey, Paul refused, and Barnabas proceeded with Mark to Cyprus, while Paul went to Syria and Cilicia with Silas. Some years afterwards we find Mark in close comradeship with Paul in Rome (Col. 4:10). In his first epistle Peter speaks of 'Mark my son' as being present with him (in Rome), a notice which harmonizes with a very ancient tradition to the effect that Mark was the companion and amanuensis of Peter, and wrote the apostle's reminiscences of Jesus. A less well authenticated tradition makes Mark the founder of the churches in Alexandria; while the story of the translation of his body from Alexandria to Venice is a much later fabrication. His name is associated with two apocryphal works, the Acts of Mark and the Acts of Barnabas, neither of any historical value.

Mark Antony. See Antonius. MARCUS

Markby, SIR WILLIAM (1829), English jurist, was born at Duxford, near Cambridge. Called to the har (1856), he became judge of the High Court, Calcutta (1866-78), and reader in Indian law to Oxford University (1878-1900). He is author of Lectures on Indian Law (5th ed. 1896); Law considered with reference to Principles of General Jurisprudence (6th ed. 1905).

Market. Originally used to denote a place in which goods are bought and sold, the word 'market' has come to mean a body of dealers trading in a particular kind of commodity. In a perfectly organized market only one price can exist at a given time for the article dealt in, such being the outcome of free competition. Stock exchanges afford the best examples of highly organized markets, but the dealings in some important commodities—corn, copper, cotton, iron, and sugar—are of the highly developed market type. To be suitable for this purpose an article must be portable, in universal demand, and capable of being easily and exactly described.' Modern facilities of communication have helped to develop and consolidate market dealing, and to diminish largely variations in prices at different places. The same influence has, however, assisted in the growth of the speculative market, which is concerned with the changes of values in time, or, in popular language, deals in 'futures.' Publicity and Publicity and freedom seem to be the most effectual agencies for preventing mistakes or intentional misrepresentations injuriously affecting the course of market prices. (See also under London-Markets.) history of markets is noticed in Maine's Village Communities (1871), Lecture 6; Ashley's Economic History, vol. i. (3rd ed. 1894). For modern markets, see

Emery's Speculation in the Stock and Produce Exchanges of the United States (1896); also Giffen's Stock Exchange Securities (1877), and Ellis's The Rationale of Market Fluctuations (3rd ed. 1879). See also FAIR.

Market Bosworth. See Bos-WORTH.

Market Drayton, or DRAYTON-IN-HALES, tn., Salop, England, 19 m. N.E. of Shrewsbury, with iron-founding and manufacture of agricultural implements. Pop.

(1901) 2,784.

Market Gardening. See FRUIT-FARMING and GARDENING. Market Harborough, mrkt. tn., Leicestershire, England, on the Welland, 16 m. s.E. of Leicester. Manufactures include corsets, pea-flour, and patent foods,

rubber goods, brushes, boots, joinery, and type-founding. The Grammar School (1614) is a most interesting timber structure. The district is much frequented for hunting. Pop. (1901) 7,735.

Market Overt. In general it is only from the owner of property that a good title can be derived; but in England, though not in Scotland, by the common law, and by the Sale of Goods Act, 1893, where goods, with the exception of horses, are sold in market overt (i.e. in open market), the buyer acquires a good title to the goods if he buys them in good faith and without notice of any defect or want of title on the part of the seller. But if the goods have been stolen, and the thief prosecuted to conviction, the property in the goods revests in the owner. In the country goods are only sold in market overt if sold in a market-place on the regular market day; but by the custom of the city of London every day except Sunday is market day, and every shop with-in the city is open market for the sale by the shopkeeper of the kind of goods in which he deals. doubtful whether a shop in the city is open market for the purchase of goods by the shopkeeper. See Hargreave v. Spink, 1891

(1 Q.B.D. 25). Markets and Fairs. right to set up a market or fair is a franchise granted by royal charter, or claimed by prescrip-tion. A fair is a market of a larger sort, held at fixed periods, generally only once or twice a year. The days on which, and the limits within which, a market or fair may be held are specified in the grant, and also the tolls (if any) which may be taken from A market may be rebuvers. moved from one place to another within the prescribed limits, which are often wide. For example, the corporation of the city of London has the right by charter to erect markets within

seven miles of St. Paul's. Even when no tolls are granted, the owner of a market may charge stallage and picage—i.e. duties for the liberty to set up a stall in the market, and to make holes in the ground for the posts of the stall. A court of pye powder or pie poudré may be held before the steward of a market for the settlement of disputes and the punishment of offences arising in the market. In modern times markets are not in practice granted by the crown, but estab-lished by local Acts of Parliament, and the rights and duties of those to whom the market is granted are usually regulated by incorporating in the special act the provisions of the Markets and Fairs Clauses Act, 1847. Town councils and other urban authorities under the Public Health Act, 1875, have the right to provide markets within their district, and to buy up or lease market rights. In Scotland, wide powers with regard to the provision and improvement of markets are granted to the commissioners under the Burgh Police (Scotland) Act, 1902, subject to the protection of existing rights. See MARKET OVERT.

Markham, Sir Albert Hast-ING (1841), British admiral, born at Bagnères, in the Pyrenees; took part in suppressing the Taiping rebellion in China (1861-62); commanded the Alert in the Arctic expedition (1875), and explored Hudson Bay and Strait. Author of Life of Sir John Franklin (1891); Life of John Davis the Navigator (1882); and A Polar Reconnaissance (1881).

Markham, SIR CLEMENTS ROBERTS (1830), English geographer, was born at Stilling-fleet, Yorkshire; served in the Arctic expedition (1850-1); accompanied the Abyssinian expedition as geographer, and afterwards became assistant-secretary to the India Office (1867-77), secretary to the Royal Geographical Society (1863-88), its president (1893-1905), and secretary to the Hakluyt Society (1858-87). He introduced the cultivation of the cinchona plant into India. His chief works are Travels in Peru and India (1862); Threshold of the Unknown Region (1874); History of Peru (1893); and numerous translations and editions of works for the Hakluyt Society.

Markham, Gervase or Jervis (?1568-1637), English author, was born at Cottam, in Nottinghamshire. After serving in the Low Countries as a soldier, he turned to literature, a calling for which he was well equipped, being a scholar, and well versed in languages. His industry was prodigious, his publications including works on sport and literature, as well as several mediocre poems and dramas.

Markham, Mrs. See PEN-ROSE, ELIZABETH.

Markirch, tn., Upper Alsace, Germany, 36 m. s.w. of Strassburg; has manufactures of cotton, woollen, and silk goods. Pop. (1900) 12,372.

Marks, HENRY STACY (1829-98), English painter, born in London. A versatile artist, he designed subjects for stained glass, and did decorative work of all sorts. He possessed much dry humour, was a student of natural history, and particularly excelled in depicting birds and their humorous ways. He published Pen and Pencil Sketches (1894).

Marks, TRADE. See TRADE

MARKS.

Mark System, for long the accepted explanation of the general agricultural organization at the beginning of the middle ages. The manor or the village community had originally been an association of free men, cultivating in common the land which belonged to all. The lord of the manor was imposed on this community by the feudal system, and the freemen were reduce I to serfdom or villeinage. This doctrine is associated particularly with the names of Kemble in England and Maurer in Germany. To the support of this theory Sir Henry Maine in his Village Communities (1871), and Laveleye in his Primitive Property (1878), brought a huge mass of miscellaneous evidence from the history of other races. Subsequent historical investigation has shown that much of the evidence on which the theory rested is worthless. Baden-Powell in his Land Systems of British India (1892) demolished Maine's theory; and Seebohm and Fustel de Coulanges have shown that much, if not nearly all, of Maurer's case for the mark of free men is an exercise in historical imagination. See VILLAGE COMMUNITY and MANOR.

Mark Twain. See CLEMENS. Marlboro, city, Middlesex co., Massachusetts, U.S.A., 25 m. w. of Boston; manufactures boots and shoes. Pop. (1900) 13,609.

Marlborough. (1.) Municipal bor., Wiltshire, England, 27 m. N.N.E. of Salisbury. A parlia-ment which enacted the 'Statutes of Marlbridge' was held here by Henry III. (1267). Marlborough Henry III. (1267). Mariborougn is famous for its public school, founded in 1843, originally for the sons of clergymen. On Marlborough Downs are noted British remains. Pop. (1901) 3,887. (2.) District, S. Island, New Zealand. Area, 4,752 sq. m. Blenheim is the capital. Chief exports wool timber, hides, and exports, wool, timber, hides, and tallow. Pop. (1901) 13,326.

Marlborough, John Church-ILL, first duke of (1650-1722), British general, was born at Ashe. Devonshire. He served under Turenne in 1672, and distin-guished himself at Nimeguen and Maostricht. In 1678 he married Sarah Jennings, a lady of the bedchamber of the Princess Anne; the marriage had decisive effects on his fortunes. Churchill showed great skill and resource in serving the royal army at Sedgemoor (1685). In 1688 he went over to the Prince of Orange, and was made Earl of Marlborough by William III. In the war in Ireland, from 1689 to 1691, his capture of the two ports of Cork and Kinsale severed the communications of France. He made his mark also in the war in the Low Countries. But he was disliked by William and his Dutch favourites. This and a strong feeling of sympathy with his old master caused Marl-



John Churchill, first Duke of Marlborough.

(Photo by Walker & Cockerell, from the painting in the National Portrait Gallery.)

borough to enter into plots with King James at Saint-Germain. His conduct in the affair of Brest admits of no excuse, if we are in possession of all the evidence. He was arrested, kept in the Tower (1692), and was for a time in disgrace. But when a rupture with France appeared impending, the king took him to Holland to negotiate for the Grand Alliance. After the death of William in 1702, he was made, largely through the influence of his wife with the new Queen Anne, captain-general of the British army. Marlborough also commanded the forces of the Dutch republic.

The career of Marlborough in the field was one of peculiar splendour. In 1702-3 he seized the line of the Meuse. In the following year he arranged with Eugene the operations that saved the empire. After a march of extraordinary skill he struck

down the veteran French and Bavarian armies, under Tallard and Marsion, on the field of Blenheim (1704), piercing the enemy's centre by finely designed attacks. He had Villars, an adversary worthy of him, in his front in 1705; and he fell back in retreat before the marshal in Lorraine, having been left in the lurch by a colleague, Louis of Baden. Then he turned the cele-Baden. Then he turned the cele-brated lines constructed by the French to cover the east of Belgium, and in 1706 won the great battle of Ramillies, the grandest exhibition of his tactical gifts. Marlborough and Eugene triumphed again at Oudenarde. on the Scholdt, another battle won by a single stroke of tactics; and having captured the great fortress of Lille, they made prepara-tions for the invasion of France. Villars, sent to defend his country, was just defeated on the terrible day of Malplaquet (1709). for the allies only won a Pyrrhic victory. Their losses, especially those of the Dutch, were enormous; the league against France was severely shaken. In 1710 the marshal covered the northern borders of France by a system of skilfully constructed lines. Marlborough, whose influence in England had been greatly weakened, became cautious, and would not attack; and though he turned the lines by a fine manœuvre in 1711, he gained only insignificant success. In 1712, on the accession to power of the Tories, he was deprived of all his commands.

Marlborough had strategic

159

gifts, but he usually conducted war on too narrow a theatre to have an opportunity to make them manifest; but as a tactician Marlborough has not been sur-passed. More than this, Marlborough was the first diplomatist of his age, and the soul of the coalition against France. He reconciled its jealousies, composed its discords, made its quarrelsome princes and statesmen agree. As a diplomatist he excelled even William III. As a statesman Marlborough holds a much lower place. The ignoble love of pelf was the most distinctive fault of his character. See Life by Saintsbury (1885); Memoirs of John, Duke of Marlborough, by Coxe (1819); The Duchess of Marlborough, by Mrs. A. Colville (1904); and Life

of the Duke of Marlborough, by Lord Wolseley (1894).
Marlitt, E. (1825-87), pseudonym of Eugénie John, German novelist, born at Arnstadt, in Thuringia. She began her career as a singer on the stage, but an affection of the ear forced her to retire. She was the author of popular romances, notably Goldelse (1866); Heideprinzesschen (1874); and Die Zweite Frau (1874).

Marlow, or Great Marlow, tn., Buckinghamshire, England, on the Thames, 5 m. s.w. of High Wycombe, with paper mills, brewery, pottery, and chair factory. Pop. (1901) 4,526. Marlowe, Christopher (1564-

93), English poet, was born at Canterbury. It is possible that he served as a soldier in the Netherlands. In 1587 he comes into clear light as a dramatist, writing for Alleyn and his company. In the two parts of Tamburlaine (1587) he wrote the first great blank verse tragedy, and his drumming decasyllabon' earned him the satire of the more oldfashioned playwright, Robert Greene, and of his friend Thomas Nash. *Tamburlaine* was followed by Dr. Faustus (c. 1588) and The Jew of Malta (after 1588); but the extant texts of all three plays have been subjected to interpolations, mainly comic, by other men. In Edward II. (c. 1592) he essayed historical tragedy, and in The Massacre at Paris (1593) contemporary tragedy. His only other surviving play, Dido, Queen of Carthage, was finished by Thomas Nash. Other plays of Marlowe have been lost, and some have been ascribed to him on insufficient grounds. It is, however, possible that he may have had a hand in one or more of the plays which formed the basis of Shakespeare's Henry VI. Marlowe's private life bore an unenviable reputation, not only for moral laxity, but also for so-called 'atheism.' In 1593 he was summoned before the privy council to answer a charge of heresy arising from some papers of his found amongst those of Thomas Kyd. Before, however, his case could be fully considered, Marlowe was dead-slain, according to one account, in a drunken brawl at Deptford by Francis Archer. His paraphrase of the Hero and Leander of Musicus was completed by George Chapman. The influence both of his dramatic and nondramatic work upon his contemporaries, notably Shakespeare and Donne, was considerable. His poems include Amores, in 'Epigrammes and Elegies;' Hero and Leander (1598); First Book of Lucan (1600). Collected works, ed. G. Robinson (1826); ed. A. Dyce (1850, 1870); ed. F. Cunningham (1870); ed. A. H. Bullen (1885); ed. H. Ellis (incomplete, 1887); ed. H. Breymann and A. Wagner (incomplete, 1885). See A. W. Verity's Marlowe's Influence on Shakespeare (1886), and Ingram's Marporaries, notably Shakespeare and speare (1886), and Ingram's Marlowe and his Associates (1904).

Marls, soft, friable clays containing an admixture of calcium carbonate. They are often full of shells, shell marl being a deposit of fresh-water lakes in

which fine mud has gathered along with the shells of Mollusca. It is used to improve peaty or acid soils. Clay soils which contain finely divided calcium carbonate, such as some of those on the Lias and Chalk, are also known as marls; but the use of the term to designate clays which are not calcareous, like the red 'marls' of the Trias (which are ferruginous), is to be avoided. 'Marlstone' is a name given to the middle Lias.

Marmalade, a kind of jam, usually made from oranges or lemons, though the term is sometimes extended to that made from quinces, crab apples, and other fruits. Sometimes a clear marmalade is made containing no shreds of orange peel.

Marmande, tn., dep. Lot-et-Garonne, France, on r. bk. of Garonne, 40 m. s.E. of Bordeaux; has a fine Gothic church of the 13th century. Linen and woollen cloths, brandy and liqueurs, are manufactured. Pop. (1901) 9,873.

Marmaros-sziget.

MARAMAROS SZIGET.

Marmier, XAVIER (1809-92), French author, born at Pontar-lier. First as professor of foreign literature at Rennes, and after-wards (1847) as keeper of the Sainte-Geneviève Library, he did much to interest his countrymen Works: in northern literature. Lettres sur le Nord (1840); Histoire de la Littérature en Danemark et en Suède (1839); translations from Schiller and Goethe: Théâtre de Goethe (1839) and Théâtre de Schiller (1841). See Estignard's X. Marmier (1893).

Marmion, SHACKERLEY (1603-39), English dramatist, born near Brackley, Northampton-shire. After service in the Low Countries, he became a playwright in London. In 1638 he accompanied Sir John Suckling's expedition into Scotland. His best known works are three coincides — Holland's Leaguer (1632), A Fine Companion (1633), and The Antiquary (1640)—and the poem Cupid and Psyche (1637).

Marmont, Auguste Frédéric Louis Viesse de, Duc de Ragusa (1774-1852), French marshal, was born at Châtillonsur-Seine, and distinguished himself in the Italian campaigns, notably at Lodi and Castiglione. He accompanied Napoleon to Egypt, and was made general of a division for his management of the guns in the battle of Marengo (1800). In 1801 he was inspector-general-in-chief of artillery, and for his victory over the Russians at Castelnuovo (1805) was created Duke of Ragusa. In 1809, after the battle of Wagram, he defeated the flying Austrians at Znaim, and was in consequence made a field-marshal. In 1811

he became commander-in-chief in Portugal, where he was op-posed to Wellington, but was severely wounded at Salamanca (1812). At the head of an army corps he participated in the great battles of the retreat from Russia, and in 1814 prolonged the contest on behalf of Napoleon against the allies outside of Paris. From 1830 he lived mostly abroad, at Venice and Vienna. See his Mémoires (9 vols. 1856-7).

Marmontel, JEAN FRANÇOIS (1723-99), French writer, was born at Limousin; devoted himself to literature by advice of Voltaire, and went to Paris in 1745. There, through the influence of Madame Pompadour, he secured an official position (1753) at Versailles, and in 1758 was appointed editor of Le Mercure, in whose columns appeared many of his stories or romances. chief story was Bélisaire (1766), a kind of political novel, which brought him into conflict with the Jesuits. He was elected to the Academy in 1763, became (1783) its secretary, and (1771) historiographer of France. His Mémoires (new ed. 1891) contain an interesting account of the 18th - century French literary salons. His *Guyres Complètes* appeared in 7 vols. (1819-20). See Life, in French, by Lenel (1902). Marmora, La. See La Mar-

Marmora, SEA OF (anc. Pro-pontis), between Asia Minor and Europe, communicates with the Black Sea by the Dosporus, and with the Ægean Sea by the Dardanelles. It is 175 m. in length and 50 m. in breadth. The E. Black Sea by the Bosporus, and shore is broken by the Gulfs of Ismid and Indjir. The chief island is Marmora or Marmara, famous for its marble.

Marmosets constitute the family Hapalidæ, and are the lowest of the anthropoid division of the Primates. They are confined to Central and S. America. and exhibit great delicacy of con-They stitution in confinement. are gentle and dainty little creatures, not unlike squirrels in appearance, and often with projecting tufts of hair on the sides of the head. They are less highly organized than the monkeys; they bear three young ones at a time; and, except the great toe, all the digits bear pointed claws. The great toe is unusually small, and the fore limbs do not exhibit that proportionate elongation so marked in many of the Primates. The tail is not prehensile, there are no callosities over the ischia, and no check-pouches. Though the total number of teeth is 32. there are three premolars and only two molars; whereas in the Old World monkeys and in man this condition is reversed. Marmosets are entirely arboreal, and their diet consists of a mixture of insects and fruit. An example is the silky marmoset (Midas rosalia) of S.E. Brazil.



Silky Marmoset.

Marmots (Arctomys) are rodents found in the northern parts of both hemispheres. They are heavily-built, rather clumsy-looking animals, living high up on mountains in the warmer part of their range, but coming down to sea-level in the extreme north. They feed on roots and leaves, and in many cases hibernate for the whole of the winter. Social in their habits, they feed in companies, and a number collect in the same burrow for the winter sleep. The ears and tail are short, as are also the legs; cheekpouches are absent or rudimentary; on the fore limbs, the first digit is rudimentary and bears a flat nail. In Europe occurs the Alpine marmot (A. marmotta), often heard, but rarely seen, in the Alps. It is about twenty inches long, and has a peculiar shrill alarm whistle. In E. Europe and in Siberia occurs A. bobac, a rather smaller form.



Alpine Marmots.

Asia has a number of species. The American forms differ in some respects from their Old World allies; the commonest is the woodchuck.

Marne. (i.) River, France, rises on the plateau of Langres, dep. Haute-Marne, and flows north-west and west for 326 m., past Châlons, Epernay, and Meaux, to join the Seine on r. bk.

at Charenton, 2 m. s.r. of Paris. It is navigable as far as St. Dizier, but a lateral canal stretches from Epernay to Vitry (where the Marne-Rhine canal goes off to the E.); it is continued thence to beyond St. Dizier. The Haute-Marne canal starts at Donjeux, and connects the navigation of the Marne with that of the Saône. (2.) Department, France, part of old prov. of Champagne, is bi-sected by the river Marne. The centre is gently-rolling country; the rest flat and monotonous. The climate is dry and sunny, and well suited to the cultivation of wheat and wine (champagne), in which last the wealth of the depart-ment chiefly consists. The wine is matured in the cellars of Rheims, Epernay, and Châlons, this last the capital of the department. There is a prosperous woollen industry, which centres at Rheims. There are also tanneries and iron foundries. Area, 3,167 sq. m. Pop. (1901) 432,882.

Marne, HAUTE-. See HAUTE-MARNE.

Marnix, Philip van (1538 98), Dutch writer, born at Brussels studied theology at Geneva, and on his return to his native land actively forwarded the reformation, and was a sworn foe of the Spanish government and the Inquisition. When the Duke of Alva was made governor of the Netherlands (1567) Marnix fled to Germany. He represented William of Orange in missions to England and France, and took a prominent part in the formation of the union of Utrecht. He was mayor of Antwerp during the thirteen months' siege of 1584-5. He wrote the Wilhelmus song, the hymn of Dutch liberty; and De Romsche Bijen-korf (1569), a prose satire on the Roman Catholic Church. See *Life*, in French, by Juste (1858), and in Dutch by Tjalma (1896). Marocco. See Morocco.

Marochetti, Carlo (1805-68), Italian sculptor, born at Turin; but settled in Paris (1827). His chief productions were A Girl playing with a Dog, The Fallen Angel, The Battle of Jemappes (a relief upon the Arc de Triomphe de l'Etoile), a memorial for Bellini's tomb, and various equestrian statues. Coming to England on account of the revolution (1848), he became R.A. (1866), and executed statues of Richard Cœur de Lion in London, and Queen Victoria and the Duke of Wellington in Glasgow.

Maronites, a body of Christians, numbering about a quarter of a million, who have their centre at Kanobin in Mt. Lebanon. They are a relic of the Monothelite sect. Throughout the Mohammedan conquest the Maronites preserved their ancient

faith, but united with the Roman Catholic Church in 1182; and in 1584 Gregory XIII. established in Rome a college for the training of their clergy. In many things they still hold to their traditional usages; their sacred tongue is the ancient Syriac. They have suffered severely at the hands of the Druses, and in 1860 the savagery of both sides reached such a pitch as to necessitate the intervention of the great powers. See Bliss's Essay on Sects . . . of Syria: The Maronites (Palestine Exploration Fund, 1892). See DRUSES.

161

Maroons, a term applied to runaway negro slaves taking refuge in the inaccessible parts of the W. Indies. Here they some-times became strong enough to form independent republics, which long held out against the constituted authorities. In Jamaica, after the British occupation (1655), some 1,500 slaves, joined by others escaping from the English planters, continued in rebellion, and were not finally reduced till the year 1795, when many of the survivors were removed to Nova Scotia, whence later most of them found their way to Sierra Leone. In Dutch Guiana, where they are now known as Bush Negroes, the Maroons were never reduced. See Lady Blake, North American Review (Nov. 1898); W. G. Palgrave's Dutch Guiana (1876).

Maros Vásárhely, tn., Hungary, cap. of Maros Torda co., on l. bk. of Maros, 47 m. E.S.E. of Klausenburg; has a citadel and a fine Gothic church (1446). Sugar, spirits, and tobacco are manufactured. Pop. (1900) 17,715.

Marot, CLÉMENT (1496-1544), French poet, born at Cahors, and was page to Marguerite d'Alencon, afterwards queen of Navarre. He took part in the expedition to Italy: was wounded and taken prisoner at the battle of Pavia: but, soon released, he returned to Paris, where he began to show the anti-Catholic tendencies which made him many enemies and gave considerable trouble to his friends. He was repeatedly arrested and imprisoned—once in the Chatelet, which he describes in L'Enfer. He published a version of the Psalms, which, set to favourite secular airs, became popular at the French court and with the Huguenots. His poems are distinguished for graceful satire, a singularly light touch, and natural expression. The distinctive style Marotique, as it is called, has had much influence on French literary language. His Œuvres Complètes appeared in 1538 (new ed. 1881). See H. Morley's Clément Marot (1870).

Marozia (d. 938), a lady of Rome, notorious for her infamous life, daughter of the Empress Theodora and of Theophylact. As mistress of Pope Sergius III. and mother or grand-mother of three popes John XI., John XII., and Leo VII.), she had entire control of Rome for some trix of all the Romans' and 'Patricia.'

Marprelate Controversy, a pamphlet warfare carried on (1589-90) by the Elizabethan Puritans against the established system of Episcopacy. The pamphlets were by various writers, but were generally issued under the generic pen-name of Martin Marprelate. The authorities endeavoured to repress their licence by severe measures, and some of the writers paid the penalty of These pamphlets were met by others defending Episcopacy, and Bacon intervened to make peace with an essay in favour of moderation and tolerance. See W. Maskell's Hist. of the Marprelate Controversy (1845).

Marque, Letters of. Letters of Marque.

Marquesas or Mendaña Islands, archipelago in the Pacific, between lat. 8° and 10° 30′ s. and long. 138° 30′ and 140° 40′ w., annexed to France (1842), and in-cluded in the Tahiti administration. Total area, 480 sq. m. The largest, Nukahiva, has an area of 186 sq. m., and it reaches an alti-tude of 3,840 ft. All the islands are mountainous, and lie in deep Productions: oranges, copra, yams, and mother-of-pearl. Pop. 4,300.

Marquetry, wood mosaic, veneering (rinlaying common white wood with slices of rare and costly woods or other material. The art was known in Egypt and the East two thousand years ago, is mentioned in the Odyssey (Penelope's bed'), and was introduced from Persia into Venice (14th century), whence it spread to Florence, France, Germany, and Holland. As intarsia it is conspicuous in church woodwork of the 15th century. Charles André Boule (1642-1732) produced his beautiful 'boule-work.' In the 18th century Reisner and David Roentgen were famous ébénistes. rieties are moresco (black and white), certosina (cypress or walnut inlaid with ivory), boule (tortoiseshell ground with design in metal), counter (metal ground with tortoiseshell inlay), scailline (imitation tortoiseshell), pokerwork, and Chippendale furniture. See Turck's Marqueterie for Amateurs (1899), and F. H. Jackson's Intarsia and Marquetry (1903).

Marquette, city, Michigan, U.S.A., co. seat of Marquette co., in the Upper Peninsula, on the coast of Lake Superior; ships iron

ore. Pop. (1900) 10,058.

Marquis, or MARQUESS, the second order in the peerage of England, ranking below a duke and above an earl. The title was originally applied to certain officers appointed to defend the marches or borders of Wales. The first marquess proper was Robert de Vere, Earl of Oxford, who was created Marquess of Dublin by Richard II. in 1386.

chioness. Marquis is often the courtesy title of the eldest son of a duke during his father's lifetime.

Marr. See MAR.

Marradi, Giovanni (1852), Italian poet, was born at Livorno (Leghorn). In Florence he founded, with Ferrari and others, the short-lived but brilliant review, I Nuovi Goliardi. He was

3

Marriage Casket in Marquetry of Tortoiseshell and Metal, by Boule. (Wallace Collection.)

In 1397 Richard made John Beaufort, Earl of Somerset, Marquess of Dorset. The oldest existing marquisate is that of Winchester, dating from Edward VI. in 1551. The eldest son of a marquis is generally by courtesy an earl, and the younger sons and the daughters are styled lords and ladies. His wife is a mar-

then made inspector of schools for the province of Massa-Carrara. Though a poetic disciple of Carducci, Marradi struck out a line for himself. He impresses by his elegant style and his love of nature. His poems were col-lected at Florence in 1902.

Marrakesh. See Morocco CITY.

Marriage consists essentially in the cohabitation of males and females for the purposes of re-production and the care of offspring. Among animals the sanction of marriage is rooted in instinct; among the lower human races it is founded on the slow growth of customs and traditions; among the higher human races marriage becomes an institution in which the sanction of legal enactments is superimposed on to that of custom and tradition. The care of offspring is an essential element in the constitution of marriage.

Primitive Human Marriage .-Among the higher vertebrate animals—birds as well as mammals – monogamy, and occasionally polygamy, prevail, though the union may persist for no more than a single breeding season. It has been argued that the marriage of earliest man must have corresponded to the monogamy and polygamy prevailing among modern anthropoid apes. To this it may be replied that it is highly probable that the earliest men, in raising themselves to a higher level than that of the apes, may well have developed qualities of self-restraint which involved a more complex system of marriage, such as we indeed seem to find survivals of among some primitive races to-day. We are not entitled to state confidently that the earliest form of human marriage was either a more or less regulated promiscuity (as Morgan, M'Lennan, and Lubbock believed) or an individual marriage resembling that of the higher apes. The theory of primitive promiscuity was mainly supported by the existence of supposed 'survivals,' but it has always to be remembered that there is no true analogy between such survivals and the vestigial remains in bodily structure. There is, however, some reason to think that, whatever the most primitive form of human marriage, actual pairing was probably mainly periodical and influenced by season. We may perhaps believe (with Schurtz) that individual marriage has prevailed more or less from the first, but that side by side with this other sexual habits and customs grew up and sometimes reacted on individual marriage.

Courtship .-- Among many animals and among most savages courtship is a necessary preliminary to sexual union. It may be defined as the process whereby both the male and the female are brought into the state of psychic desire and physical tumescence which is essential to sexual conjugation. Courtship is thus an essential preliminary to marriage, in the biological sense—not a mere social custom—and it is rooted in

physiological and psychological demands.

Group Marriage.—The most primitive form of marriage system of which any trace can now be detected-though even here the evidence is far from complete or altogether satisfactory-is that known as group marriage, which has been carefully investigated in Australia. In group marriage all the women of one class are regarded as the actual, or at all events the potential, wives of all the men of another class. Early investigators, such as Morgan, fell into the mistake of regarding the 'classificatory system' of relationship with which this kind of marriage is associated as sound evidence in favour of the actual or former existence of such marriage. This cannot, however, be accepted, for systems of relationship among primitive peoples are much less closely dependent on actual blood ties than later became the case. Even, however, when this kind of evidence is discarded, it would appear that sometimesas the careful investigation of Spencer and Gillen has shown to be the case among the Australian Urabunna—'a group of women of a certain designation are actually the wives of a group of men of another designation.' Polyandry, occurring especially in Tibet, by which usually all the brothers in a family are the husbands of one wife, may be regarded as a restricted kind of group marriage on a small scale.

Among many primitive peoples descent is reckoned not in the paternal but in the maternal line. Bachofen, who first showed the wide prevalence of this custom, founded on it his theory of the matriarchate. He regarded the universal original state of human society as one of promiscuity, in which fatherhood was unknown, and authority rested mainly with the mother, through whom alone descent could be traced. This theory can no longer be maintained in its original We do not know that female descent has been universal; it is by no means necessarily associated with ignorance of paternal descent, nor is the supremacy of woman involved, although female descent seems favourable to the high social standing of women.

Marriage by Capture.—On the whole, it may be said that individual marriage, more or less permanent and usually monogamous, has been the prevailing human type. Considerable importance was formerly attached to the distinction between endogamy (marriage within the tribe) and exogamy (marriage outside the tribe), but, as a rule, marriage is at the same time both endogamous

in its avoidance of racially remote groups, and exogamous in its avoidance of union within the family, although it may tend to sway more in one direction than the other—usually in the direction of exogamy. This is favourable to marriage by capture, which has certainly been a widespread method of obtaining wives among uncivilized peoples. M'Lennan and others who emphasized the importance of marriage by capture have, however, gone too far in asserting its universality, and also in including with it, as survivals, many customs which required a wider explanation. Crawley has shown that a large number of these customs must really receive a psychological and religious interpretation, and are to be regarded as 'a ceremonial use of force,' which is at the same time a concession to female modesty and bashfulness, often allowing the woman also to avoid marriage if she really wishes to do so. 'Marriage by capture' must therefore be regarded as only in rare and sporadic cases a brutal rape of women who may or may not be willing, but more usually a recognized and accepted form of courtship.

Marriage by Purchase and Polygamy.—It is commonly held that with the growth of social order marriage by capture slowly gives way to marriage by purchase. They frequently overlap, how-ever; and it has also to be remembered that, as Crawley points out, among primitive peoples purchase' has not so narrowly commercial a significance as it has with us, and that the price given on receiving the bride has a compensatory and often ritual significance, and is not necessarily a mere barter which degrades the position of the wife. Polygamy, either in its simple form or in its modified form of concubinage, is frequently associated with a developed marriage-by-purchase system. It is not common among the lower savages, but is found more frequently in the more advanced stage of barbarism, when civilization is beginning to develop, and when a great deal of authority is centred in the husband and father who is the head of the family group—the patriarch. Polygamy is found only among the richer individuals even in the social groups in which it occurs, and it dies out as civilization still further progresses. The marriage system in Europe during historical times has been a monogamy in which the patriarchal authority has shown a constant tendency to decrease.

Modern Marriage.—The modern tendency—it cannot be said to be more than a tendency—is to regard the relationship as strictly

a contract in which each party should have equal rights and equal duties. There are, however, difficulties in the way of this reasonable and legal method of looking at the matter, and, in fact, it has not proceeded in England so far even as the equalization of divorce, so that while a husband may obtain a divorce for adultery alone, a wife cannot. The natural incidence of the burden of reproduction is not equal, for while the man's part is small, the woman's part is large. Complete equalization involves the economic independence of the mother, but the mother cannot at once be an effective child-bearer and an effective bread-winner. just the matter by assuming that the woman bears the child for her husband, and that in return he supports her and it. We are, however, then landed in another in-equality; for by this arrangement the child belongs to the father, although on a natural basis the child belongs primarily to the mother, of whose flesh and blood it is formed. The difficulties of marriage are further increased by the complexity and individualization involved by civilized life. It has been found that there is a tendency for like to mate with like. In a primitive community, where individualization has not progressed far, satisfactory mating is com-paratively easy; but with an increased development of faculties and tastes, and the increased complexity of individual de-mands, successful mating becomes much more difficult-all the more so since its success cannot be determined until the decision is already irrevocably made. Notwithstanding these difficulties, there are no indications that marriage will tend to assume forms more complex than that of monogamy. It seems most probable that, as we see to a very marked extent in the United States and to a slighter degree in Europe generally, monogamy will succeed in surviving by adjusting itself to modern conditions with the help of a greater facility of divorce—causes more subtle than adultery, but equally fatal to successful marriage, being regarded as an adequate motive for divorce. The reality, honesty, and sacredness of marriage are thus preserved at the expense of a stability which in an increasingly large number of cases is incompatible with genuine mating in marriage and an incentive to irregular unions. The future of the children will always remain an important matter for mutual arrangement, not to be settled by any invariable rule.

Bibliography. — As a general biological introduction to the

subject the best book is probably The Evolution of Sex, by P. Geddes and J. Arthur Thomson (1889; revised ed. 1901). On the psychological side see Studies in the Psychology of Sex (1897), by Havelock Ellis, more especially the studies entitled 'Analysis of the Sexual Impulse,' 'Sexual Periodicity,' and 'The Sexual Impulse in Women.' For marriage among primitive peoples, E. B. Tylor's Primitive Culture (4th ed. 1904) may be recommended. On the general sociological side an excellent guide, with summaries of the more important studies, will be found in Durkheim's sociological year-book, L'Année Sociologique, from 1896 onwards. The best history of marriage is Westermarck's History of Human Marriage (1891), alike for its wealth of reliable facts, its clear presentation of theories, and, above all, its judicial and scientific spirit: the subject was here first placed on a sound biological basis, although it is possible to dissent at many points, and some revision in the light of more recent investigation is now needed. Letourneau's Evolution of Marriage (Eng. trans. 1891), though less authoritative and reliable, is a convenient ethnographic summary of the main facts as found among the various peoples of the world. As an admirable example of detailed investigation of marriage customs among primitive peoples, reference may be made to The Native Tribes of Central Australia, by Baldwin Spencer and F. J. Gillen (1899). J. G. Frazer's Holden, Bough (1890; new ed. 1900) embodies a wealth of instructive facts concerning the relations of the sexes among primitive peoples, emphasizing especially the significance of religious sentiment. The most notable of recent contributions to the subject of primitive marriage is Crawley's Mystic Rose (1902). The Journal of the Anthropological Institute contains valuable contributions to the facts and the theories of marriage.

MARRIAGE IN THE ARMY.—For military purposes, only such marriages are recognized in the army as are contracted in compliance with the military regulations on the subject. All officers and warrant officers are free to marry without any special permission to do so; but a warrant officer ought to inform his commanding officer of his intention to do so. All soldiers below this rank must obtain, previous to marrying, the consent of their commanding officer; otherwise their names will not be entered on the 'married roll.' This consent can only be given if the woman is respectable, and when

there is already a vacancy in the fixed number of those allowed to be on the married establishments of their respective units. In the case of a soldier under the rank of sergeant, the man must have at least seven years' service, two good-conduct badges, and five pounds in the savings bank. The married establishment of a unit may include all non-commissioned officers above the rank of sergeant, half those of sergeants rank, and, in the cavalry, artillery, and engineers, 4 per cent., in the infantry 3 per cent., of the rank and file (corporals and privates). A soldier married before enlistment, or one who has married without leave, may not be admitted to a vacancy in the married establishment, except in special cases.

Marriage Law. In English law marriage is the 'voluntary legal union for life of one man with one woman to the exclusion of all others.' Thus a polygamous marriage, or one in which consent is absent, is void.

sent is absent, is void.

Capacity.—The legal age for marriage is fourteen in males and twelve in females. Minors must obtain the consent of their parent or guardian, unless the minor is a widow or widower; but the want of such consent does not invalidate a marriage. For other impediments see NULLITY OF MARRIAGE.

Marriage in a Church of England Church. - (1.) By banns. The publication of banns and marriage in church is regulated by the Marriage Act of 1823. If the banns are not published, or are improperly published -c.g.under false names, and both parties are aware of it—the marriage is null and void. A clergyman is entitled to seven days' notice of banns, which must be published in both the parishes where the parties reside, and in the church where the marriage is to take place, on three Sundays before such marriage. The marriage must take place within three months of the last publication of banns; and the notice to the clergyman should state the names and place of residence of the parties. Fifteen days' real residence in the parish is sufficient, and the clergyman ought to satisfy himself as to this; but non-residence does not affect the validity of the marriage when once it has been celebrated. The banns are void if the parent or guardian of a minor publicly for-bids the banns. (2.) By licence. (a) A special licence is issued by the Archbishop of Canterbury at Doctor's Commons, and costs about £30. It enables the parties to be married in any place what-ever, at any time of the day or night. (b) An ordinary licence costs from £2 to £3. It is granted by the surrogate of a bishop or archbishop, and dispenses with the publication of banns. One of the parties must swear that there is no impediment, that one of the parties has resided for fifteen days in the parish where the marriage takes place, and, in the case of a minor, that the necessary consent has been obtained. Perjury is apparently not punishable, and has no effect on the validity of the marriage; but a person who marries a minor without consent forfeits all interest in the property of the minor.

Marriage not in an English

Church. - Marriage outside a church may, under certain conditions, be celebrated at a registry office, or at any registered place of worship which has also been licensed for marriages by the registrar-general, after a petition, showing that the place of worship has been used as such for one year, and (except in the case of a Roman Catholic chapel) is a separate building. Such marriages are either by licence or certificate. Notice must be sent to the district registrar together with a solemn declaration (falsehood as to which amounts to perjury) that there is no impediment; that, in the case of a certificate, the parties have resided seven days, or, in the case of a licence, fifteen days, in the district where the registry office is; and that the requisite consents have been obtained in the case of minors. In the case of a certificate the notice must be given in the district of each of the parties. The certificate authorizing marriage will be granted twenty-one clear days after the notice in the case of marriage by certificate, and one clear day after notice in the case of marriage by licence. The marriage may then take place in any registered place of worship in the district of either of the parties, or, when there is no such place, in the nearest place of worship to the district, or in the usual place of worship of either party, being not more than two miles from the district. Facilities are given for forbidding the marriage, or for entering a caveat against it. The marriage may be celebrated in any form between 8 a.m. and 3 p.m. within three months of the notice; but a statutory form of words embodying the consent must be pronounced in any form of marriage adopted. By the Marriage Act, 1898, the presence of the registrar is no longer requisite at a registered place of worship, provided a minister is present. In a registry office no religious ceremony may be performed, and the statutory words alone are adopted. A person married in a registry office may subsequently be married in a church. A clergyman cannot be compelled to marry divorced persons, though such persons can be married in their parish church.

Jews and Quakers. - If either of the parties is a Quaker, or is in community with the Quakers, the marriage may be celebrated in a registered Quaker place of worship wherever situate, on a certificate by the Quaker secretary that the marriage is authorized, and on certificate or licence by the registrar. If both parties are Jews, the marriage may be celebrated according to the Jewish rites by the secretary of the husband's synagogue, in any synagogue or private house on the registrar's certificate or liconce. But marriage within the pro-hibited degrees, though good by Jewish law, is void by English.

Scotland. - In Scotland, marriages are regular or irregular, and an irregular marriage is void unless the usual place of residence of one of the parties was in Scotland, or a party had resided in Scotland twenty-one days before the marriage. Regular marriages may be celebrated by a clergyman after banns, or the publication of a notice required by the Marriago Notices Act, 1878; or before a registrar. Any acknowledgment of marriage, even without witnesses, or a promise of marriage followed by intercourse, will constitute an irregular marriage; and perhaps even inter-course followed by a promise of marriage has the same effect. Irrogular marriages may be registered on application to a sheriff. who gives a warrant to the registrar. (See Habit and Repute.)

Ireland. - Protestant Episcopalian marriages are governed by a Marriage Act of 1870, similar to the English acts. Marriages between two Roman Catholics may be celebrated at any time or place without witnesses by a Marriagos between a priest. Protestant Episcopalian and a person who is not one, or between a Roman Catholic and a person who is not one, may only be celebrated by a Protestant or a Roman Catholic respectively on a registrar's certificate in a place of worship between 8 a.m. and 2 p.m. A Presbyterian may be married to a person of any religion in a registered meeting-house between 8 a.m. and 2 p.m., on banns or licence. Civil marriages also take place, as in England, at a registry office.

Marriage with Foreigners.—
The utmost caution must be exercised in the case of marriage with foreigners, especially Frenchmen, as many marriages are invalid abroad, though valid in England.

Marriages at Embassies, etc .-By the Foreign Marriages Act, 1892, British ambassadors or their chaplains, British consuls, or high commissioners, or the commanding officers of British ships on foreign stations, may be authorized by warrant to act as marriage officers. Seven days' residence and fourteen days' publication are required before the marriage can be celebrated. Marriages within the lines of a British army abroad are valid if celebrated by a chaplain or an officer deputed to perform them. Marriages on board merchant ships without a clergyman are of doubtful validity. See Hammick's Marriage Law of England (2nd ed. 1887)

Marrickville, suburban bor., co. Cumberland, N.S.W., Australia, 3½ m. s.w. of Sydney. It contains factories and market gardens. Pop. (1901) 18,820.

Married Women's Property. See HUSBAND AND WIFE.

Marrow, the soft tissue which fills the hollow shafts of the long bones. It is very vascular, made up of fat areolar tissue (loose delicate network, with numerous interstices), fat and marrow cells, and many blood-vessels. It lies not only in the hollow shafts and in the spongy ends, but also in the larger Haversian canals. Its function is apparently to produce red blood corpuscles. For that reason the red marrow has of late years been given in cases of anemia, particularly in pernicious anaemia, though apparently with only temporary success. Various forms of inflammation (osteo-myelitis) are the commonest marrow diseases; also tumours may originate there.

Marrow Controversy, a dis-

Marrow Controversy, a discussion current in the Church of Scotland (1718-27) over the orthodoxy of a work, The Marrow of Modern Divinity, published in 1646 by Edward Fisher, an English Puritan, which refuted the errors of Antinomianism and Neonomianism in a series of dialogues. Reprinted by Thomas Boston (1718), it was condemned as heterodox by the General Assembly in 1720—Boston, the two Erskines (afterwards the founders of the Secession Church), and Hog of Carnock dissenting. It was long popular among Scottish evangelicals.

Marryat, FLORENCE—MRS. FRANCIS LEAN—(1838-99), English authoress, actress (fifteen years), and journalist, youngest child of Captain Marryat, was born at Brighton. Love's Conflict (1865) was followed by seventy-five other novels, four of the latest (1891-94) dealing with spiritualism, in which she firmly believed. Her works have been successfully dramatized in nine cases. My

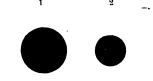
Own Child would seem to be her most popular, and There is no Death her most remarkable book, it being a 'transcript of her own experience' in spiritualism.

Marryat, FREDERICK (1792-1848), English novelist, born in Westminster; entered the royal navy under Lord Cochrane (1806), and took part in all his exploits till invalided from the Walcheren expedition (1809). He afterwards took part in the war in Burma. Settling at Hammersmith (1830), he took to literature. He was editor of the Metropolitan Magazine (1832-5). His chief novels were Frank Mildmay (1829), The King's Own (1830), Midshipman Easy (1834), Jacob Faithful (1834), and Children of the New Forest (1847). See Life and Letters of Captain Marryat (1872), by Florence Marryat.



N.
Telescopic View of Mars,
showing the canal Lethes extending northwards
from the Syrtis Minor.

Mars, the fourth planet from the sun, travels round it in a period of 687 days, at a mean distance of 141½ million miles. Its orbit is considerably eccentric (c = 0'09326), and is inclined to the ecliptic at an angle of 1° 51′. At favourable oppositions, when within 35½ million miles of the earth, Mars shines as a red star of more than twice the brightness of Sirius. The globe of Mars has



1. The Earth. 2. Mars, same scale.

a mean diameter of 4,230 miles, and rotates in a period of 24 hrs. 37 min. 23 sec. on an axis inclined 24° 50′ to the orbital plane. Seasonal variations are hence strongly accentuated, and their effects are visible in the melting and re-formation of polar

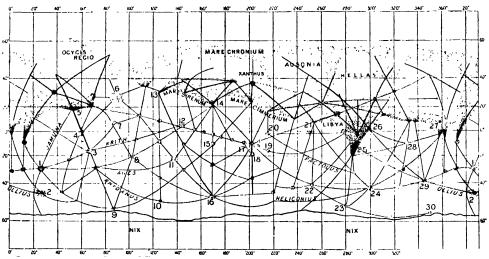
The atmosphere is snow-cans. thin, and usually transparent. The general surface is reddish, but three-eighths of it is covered by blue-green tracts, in the main permanent, though subject to minor variations. They were minor variations. long regarded as seas, but are now thought by many to represent areas of vegetation. Thev are connected by an intricate network of canals, detected by Schiaparelli in 1877, some of which appear at times to be double. But their objective existence is not universally admitted, and Mr. Maunder's recent experiments (Monthly Notices, June 1903) lend partial support to the opinion of their optical production. In May 1905 Lowell

18 min.; that of Phobos is 7 hrs. 39 min., or less than one-third the rotation period of its primary —a relation without precedent in the solar system. Neither satellite, it is probable, has a diameter exceeding twenty miles. Lowell's Mars (1896).

Mars, in Roman mythology the god of war, who was identified with the Greek Ares. He was the reputed father of Romulus. As the protector of the national industry, agriculture, he was called Silvanus; as the protector of the citizens, he was worshipped as Quirinus; and as the war-god proper, as Gradivus. The field of exercise for Roman youth was called the Campus Martius. Mars is a contraction of Mavors but more delicate in flavour and somewhat sweeter. Its alcohol content varies between 20 and 25 per cent.

Marsala, fort. seapt. tn., prov. Trapani, Sicily, 102 m. by rail s.w. of Palermo, is noted for its wines. It has a cathedral, and occupies the site of the ancient Lilybaum, the chief for tress of the Carthaginians in Sicily. Exports, chiefly wine and brandy (1905), £372,158. Pop. (1901) 57,824. Marsden, William (1754-1836),

British author and coin collector, born at Verval, Ireland. served in the East India Company at Bencoolen, Sumatra (1771-79), and on his return home became secretary to the Admiralty (1795-1804). He presented his



Map of the Planet Mars, on Mercator's Projection Based on a drawing by Professor Lowell. By permission.

11. Bandusiæ Fons.

Nodus Gordii.
 Cirenius Lucus.

14. Titanis Lucus.

15. Augila.

16. Propontis.
17. Trivium Charontis.
18. Charontis Lucus.
19. Cassotis Fons,

1. Niliacus Lucus. Acidalius Lucus.
 Lucus Lunæ.
 Oleaster Lucus. 5. Auri Lucus

6. Solis Lacus. 7. Messeis Fons. 8. Ascræus Lucus. 9. Ulyssis Lucus. 10. Fortung Lucus.

issued a bulletin (No. 21) with photographs of Mars, which he claimed as corroborating the objective existence of the canals. There are no mountain ranges on Mars, and the climate seems to be mild, although the theoretical mean temperature is about 25° c. below that of the earth. The first map of Mars was constructed by Mädler in 1830; the most elaborate by Schiaparelli in 1888. Mars has two satellites, Deimos and Phobos, discovered by Asaph Hall in August 1877. The orbits of both are circular, and coincide approximately with the planet's equatorial plane. Their radii measure respectively 14,600 m. and 5,800 m. The period of Deimos is 30 hrs. or Mavers; the Oscan form of the name was Mamers.

Mars, a British first-class battleship (14,900 tons) launched The name came into the in 1896. navy in 1746.

Mars, ANNE FRANÇOISE HIP-POLYTE BOUTET-MOUVEL (1779-1847), generally known as Mdlle. Mars, French actress, was born in Paris. In 1799 she joined the Comédie Française. With many natural gifts, she succeeded in classical and contemporary plays. and created more than a hundred characters. She retired in 1841. See her Mémoires, ed. by R. de Beauvoir (1849), and her Confidences (1855).

Marsala, a light-coloured Sicilian wine of the sherry type.

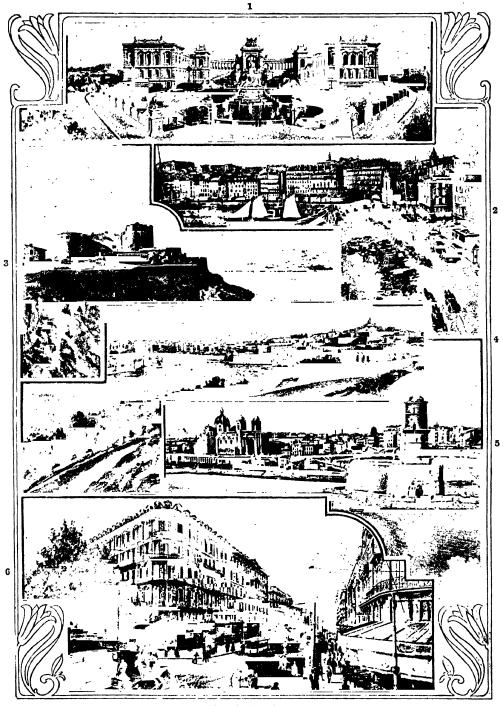
Casuentus Lucus. 30. Arcthusa L Oriental books and MSS. to King's College, London, and his splen-did collection of coins to the British Museum. He wrote His-tory of Sumatra (1783), Dictionary (1812), and Grammar of the Malayan Language (1812), and Numismata Orientalia (1823-5).

26. Hipponis L 27. Sabseus Sin 28. Sirbonis Lu 29. Ismenius L

21. Minor Lucus.

Aquæ Calidæ,
 Copais Lucus,
 Pseboas Lucus.

Marseillaise, the French national hymn, composed by Claude Joseph Rouget de Lisle, a young engineer officer at Strassburg, in From being sung by the volunteers of Marseilles when they entered Paris, and later at the storming of the Tuileries, it was designated by the Parisians the Hymne des Marseillais, and later La Marseillaise. Its use was forbidden during the restored French monarchy and the empire.



Views in Marseilles.

Palais Longchamp (Musée des Beaux Arts).
 Quai de la Fratermié.
 Château d'If.
 The Old Port and Notre Dame de la Garde.
 Fort St. Jean and Cathedral.
 Rue de Noailles and Cannabière.

Marseilles, chief tn. of dep. Bouches-du-Rhône, France, stands 27 m. E. of the Rhone mouth, round a landlocked natural basin (the Old Port). Marseilles has been a place of commercial importance from very early times, and now shares with Genoa the commercial supremacy of the Mediterranean. The town is girt in by hills covered with vineyards and olive-groves, and dotted with white country houses. The port is entered and cleared annually by over 14,500,000 tons. value of the trade done amounts annually to nearly 90 millions sterling, the proportion of exports to imports being about 2:5. The leading articles of trade are coal, oil-seeds, grain, soap, and petroleum. The chief imports petroleum. The chief imports consist of cereals, petroleum, oil-seeds, copra, groundnuts, coal (averaging annually over £3,000,000), wine and spirits, oils (olive, cotton-seed, and palm), flour, sugar, coffee, and pepper; while the chief exports include brandy, grain and flour, semolina and macaroni, oils (vegetable and mineral), oil-cake, soap, refined sugar, and wine (over £2,100,000 annually). The manufacturing industries yield sugar, soda, metals (especially of lead-smelting), macaroni, and leather; but Marseilles's specialties are oil-refining and soap-making. The fishing industry, especially for tunny, is fourishing. The headquarters of the French Messageries Maritimes and the Fraissenet Steamship Co., Marseilles is also touched at by the British P. & O. and many other lines. The city has been greatly improved since 1853. Of the older structures the 1893. Of the older structures one most interesting is the church of St. Victor, with its 11th-century crypt. The mariners church of Notre Dame de la Garde surmounts a hill (480 ft.) between the city and the sea. The Cannabière, the main street of the city, is a source of pride to the inhabitants. Off the port lies the Château d'If, associated with Dumas's Count of Monte-Cristo. Originally perhaps settled by Phoenicians, Marseilles owes its historical foundation to a Greek colony of Phocæans (600 B.C.). Having espoused the cause of Pompey, it was besieged and captured by Cæsar (B.C. 49), and under Roman domination was famous alike for its commerce and its culture. Semi-independent through the middle ages, Marseilles was deprived of many of its privileges as a free port by Louis XIV. (1660). In 1720 it was fearfully ravaged by the plague. At Marseilles were born Pytheas, Petronius Arbiter (d. 66), Puget the sculptor (d. 1694), the Girondist Barbaroux (guillotined 1794), and Thiers (d. 1877). Pop. (1901) 491,161.

Marsh, George Perkins (1801-82), American philologist and diplomatist, was born at Woodstock in Vermont. In 1842 he was elected to Congress, and in 1849 became United States minister at Constantinople, and in 1861 in Italy. He translated Rask's Icelandic Grammar (1838), and published Lectures on the English Language (1861), The Origin and History of the English Language (1862), and Man and Nature (new ed. 1874). See Life by his widow (1888).

Marsh, Herbert (1757-1839), bishop of Peterborough, born at Faversham, Kent. He attracted Pitt's attention by works which did much to help the credit of the Bank of England at a crisis. These were the translation of an Essay by Patje (1797), History of the Politics of Great Britain and France (1799), and a Postscript (1799). He became bishop of Llandaff (1816), and was translated to Peterborough (1819).

Marsh, Othniel Charles (1831-99), American palaeontologist, was born at Lockport, New York, and became professor of palaeontology at Yale in 1866. He discovered extinct saurians and birds, and raised much discussion on the links between birds and reptiles. His principal books were Odontornithes, a Monograph on the Extinct Toothed Birds of N. America (1880); and Dinocerata, a Monograph on an Extinct Order of Gigantic Mammals (1886).

Marshal, originally a groom or manager of horses. The term came to be applied to one of the principal officers of the king's household. To the marshal in feudal times belonged the right of determining precedence; and in England the earl marshal, a dignity now hereditary in the Duke of Norfolk, is ex-officio head of the College of Heralds. In Scotland, since the attainder of the Keiths in 1716, the office of carl marischal has been in abeyance.

Marshal, WILLIAM, FIRST EARL OF PEMBROKE (c. 1146-1219), regent of England, was one of Henry II.'s most trusted knights, and tutor to Prince Henry. After 1187 he fought in the French campaigns, and became marshal of England (1194). On John's death (1216) Pembroke became

regent during Henry's minority.

Marshall, ALFRED (1842), English political economist, was born in London, and has been professor of political economy at Cambridge since 1885. He has written Economics of Industry (1879), Principles of Economics (1891), and The New Cambridge Curriculum in Economics (1903). He was a member of the Royal Commission on Labour (1891).

Marshall, JOHN (1755-1835), American statesman, born at Germantown (now Midland), Virginia, and served in the war of the revolution. In 1797 he was sent on a diplomatic mission to France; was elected to Congress (1799); was (1800-1) a member of President John Adams's cabinet, and chief-justice of the United States (1801-35). He wrote a biography of George Washington. See Life by A. B. Magruder (1885).

Marshall, John (1818-91), English anatomist and surgeon, born at Ely, Cambridgeshire; became professor of surgery at University College, London (1866), and consulting surgeon to University College Hospital (1889). He wrote Auctomy for Artists (1878), and a paper On the Development of the

Great Veins (1850).

Marshalling. (1.) If there are two creditors or legatees of an estate, A and B, and A is entitled to payment out of two funds-c.g. real estate and personal estate-while B is only entitled to payment out of the personal estate, A must take payment out of real estate if the personal estate is not sufficient to pay both A and B. (2.) If a specific devisee or legatee has his fund diminished by the action of creditors, he may recoup himself out of the residuary estate. This doctrine is known as the 'marshalling of assets.' When the owner of two estates mortgages both to one person, and only one to another person, the mortgagee of both estates must take payment as far as possible out of the estate which is not most mortgaged to the second mortgagee. This is called the 'marshalling of securities.'

Marshalling of Arms. See HERALDRY.

Marshall Islands, in the Pacific, between lat. 5° and 15° N. and long. 165° and 173° E.; form two groups—Ratak in the E. and Ralik in the w.—each of about a dozen islands. They belong to Germany. The group is administered by the Jaluit Company of Hamburg, who also hold a practical monopoly of the trade. Total area, 160 sq. m., of which Ralik occupies 107. They export copra. The inhabitants are Micronesians, and are very skilful navigators. Pop. 15,000.

gators. Pop. 15,000.

Marshalltown, city, Iowa,
U.S.A., co. seat of Marshall co.,
48 m. N.E. of Des Moines. Pop.

(1900) 11,544.

Marshalsea Prison, in Southwark, London, where debtors, persons charged with contempt of certain courts, Admiralty prisoners, and others were confined. The best description of life in the prison is found in Dickens's Little Dorrit, It was pulled down in 1849.

Marsh Gas. See METHANE. Marsh Mallow (Althora), genus of plants belonging to the order Malvacea. The common



Marsh Mallow. 1, Section of fruit.

marsh mallow, A. officinalis, is a native of Britain, occurring on marshy land near the sea. is a very hairy or downy plant, and in autumn bears panicles of flowers of a pale bluish colour. The leaves are cordate. The root is occasionally used in medicine as a demulcent and emollient, usually in the form of the syrup.

Marshman, JOHN CLARK (1794-1877), British educationist, son of Joshua Marshman (1768-1837), Orientalist, missionary, and author of the first complete Chinese version of the Bible. He assisted his father, and founded the Sumachar Durpun (1818), the first Bengali paper; and the Friend of India (1821), the first English weekly. Official translator of Bengali to the government, his great work was the promotion of education amongst the natives. He wrote The History of India (1842), and Dictionary of the Bengalee Language (1827 8).

Marsh Marigold, the popular name of Caltha palustris, a brilliantly-flowered British marsh plant, with large, shining, kidneyshaped leaves, and flowers like very large buttercups. The whole plant is redolent of greenness, coolness, and moisture. A double variety is often grown in gardens.

Marsh's Test. See ARSENIC. Marsi, Italian nation, of Sabellian race, which dwelt among the Apennines. They joined the Roman confederacy in 304 B.C. In 90 B.C., indignant at their exclusion from Roman citizenship, they were the prime movers in the Social or Marsic war against Rome.

Marsivan, or Merzifun, tn., Sivas vilayet, Asiatic Turkey, 85 m. s.e. of Sinope; has the Anatolia college and a Protestant theological institution. Cotton is manufactured. It was the scene of Armenian massacres in 1895. Pop. 15,000.

Marston, John (?1575-1634), English dramatist, was born at Coventry. Having published some satires in 1598, he took soon afterwards to writing plays. Subsequently to this he held the living of Christchurch, Hamp-shire, till within three years of his death. His first plays, The History of Antonio and Mellida and Antonio's Revenge, were acted by the children of St. Paul's in 1601. The Malcontent (an advance on these in style) was produced in 1604; Eastward Ho (which Marston wrote with Jonson and Chapman) in 1605; and in the same year, The Dutch Courtezan, Marston's best work, which Betterton subsequently revived under the title of The Revenge. Another comedy, The Parasitaster, and a tragedy, The Wonder of Women, followed in 1605; and a comedy, What You Will, in 1607. He probably had a hand in two anonymous plays, Histriomastic (1610) and Jack Drum's Entertainment His Tragedies and Comedies were



Marsh Marigold. 1, Fruit.

published in 1633; and his Collected Works edited (with Life) by J. O. Halliwell in 1856, and by A. H. Bullen in 1887. Marston's

comedy was his strong point, his observation of character being keen; in his tragedies there are scenes of some power amidst dreary wastes of bombast.

Marston, John Westland (1819-90), English dramatist, was born at Boston in Lincolnshire, and was first editor of the Psyche, a transcendental organ; made a valiant effort to keep alive the poetic drama after Lytton and Sheridan Knowles. Neither his first play, The Patrician's Daughter (1842), nor Strathmore (1849), had any lasting merit; nor, indeed, had several similar plays which followed. A Hard Struggle, a prose play produced in 1858, was more successful. His chief plays subsequent to this were The Wife's Portrait (1862); Pure Gold, one of his most successful (1863); Donna Diana, also a good play of its kind (1863); Life for Life (1869); and Broken Spells, written with W. G. Wills (1872). His last play, Under Fire, was produced in 1885.

Marston, Philip Bourke (1850-87), English poet, son of John Westland Marston, was born in London. In spite of blindness he wrote poetry which, though strongly tinged with sadness, is yet full of a strange sympathy with nature's moods. A melodic quality is its most marked characteristic. The per-sistent repetition of the same form engenders, however, a certain monotony in what is otherwise poetry of a high order. His wise poetry of a ling order. His publications include Song Tide (1871), All in All (1875), and Wind Voices (1883); and, post-humously, For a Song's Sake, ed. by William Sharp (1887), Garden Secrets (1887), and A Last Harrest (1891), ed. by Mrs. Moulton, who also edited his Collected Poems in 1892.

Marston Moor, near York, the scene of a battle (July 2, 1644) in which Prince Rupert and the Duke of Newcastle were defeated by Oliver Cromwell, Fairfax, and the Earls of Leven

and Manchester.

Marsupials, an order of mammals which constitutes the subclass Metatheria or Didelphia. The general characters of the class are stated under MAMMALS. Fossil remains show that they were once widely distributed over Europe and N. America, at a time when the higher or Eutherian mammals had not yet appeared. Now, with the exception of the American opossums, which have no marsupium or brood-pouch, and a little-known S. American animal belonging to the genus Coenolestes, they are confined to the Australian area. In other parts of the globe the primitive marsupials seem to have gone down before their more highly organ-

ized rivals; but in the Australian area many of the marsupials show, in habits and external appearance, a real resemblance to their Eutherian analogues. This shows the influence of similar conditions of existence on animals not nearly related. The marsupials are divided into the two sub-

cat, and the animals are carnivorous or insectivorous. In the Diprotodontia the incisors are few in number (there being only two in the lower jaw), the canines are small or absent, the molars have grinding surfaces, and the animals are typically herbivorous. The Polyprotodonts include four

recently discovered in the sandy deserts of S. Australia, and which bears a close resemblance to the true Eutherian mole; and (4) the Peramelidæ, or bandicoots. Diprotodonts are the more highly evolved forms. The least specialized family is that of the Epanorthida, most of whose members are extinct. The members of the family Conclestes are to some extent intermediate in structure between the Diprotodonts and the Polyprotodonts. The other families of the Diprotodonts are the Phascolomyida, or the wombats; the Phalangerida, or phalangers; and the Macropodidae, or kangaroos, which represent the highest point of specialization which the marsupials have reached.

Marsyas, in ancient Greek legend, a satyr, who, having picked up the flute discarded by Athene, challenged Apollo to a contest in which the victor was to treat the vanquished as he chose. Apollo won, and, to punish Marsyas for his presumption, tied him to a tree and flayed him alive.

Martaban, tn., Amherst dist., Burma, on r. bk. of Salwin, op-posite Maulmain; a former for-tress, stormed and taken by the British in 1825 and 185:..

Martel, Charles. Charles Martel.

Martel de Janville, Comtesse DE. See GYP.

Martelli, Pier Jacopo (1665-1727), Italian dramatist, was born at Bologna, where he became professor of eloquence (1707). He introduced the Alexandrine verse into Italy, employing it in some of his tragedies. The Italian form (called rerso martelliano) consists of fourteen syllables, each hemistich being feminine; but it never became popular. Martelli also wrote comedies and farces, and a religious poem, Degli Occhi di Gesù. His auto-biography appeared in Calogierà's Opuscoli, ii. (1729), and his collected works at Bologna (1733-5).

Martello Towers are said to have been first built by Charles v. in Italy for coast defence; but the name is derived from a tower on Cape Mortelo in Capraja, near Corsica, which resisted an attack by Hood in 1794. The martello towers on the English coast from Beachy Head to Hythe were built at the end of the 18th century, and mounted one gun.

Marten, a name applied in various combinations to a number of animals of the weasel family. From the true weasels, stoats, polecats, and their allies the martens differ in their larger size, somewhat longer legs, in the absence of a strong smell, and in the presence of a small first premolar in both jaws. In habit the martens are arboreal.



Types of Marsupials.

Folyprotodonts:—1. Common opossum (Didelphyldæ). 2. Common, and 2a thylacine, dasyure (Dasyuridæ). 3. Marsupial mole (Notoryctidæ). 4. Long-nosed bandicoot (Perameldiæ). Diprotodonts:—5. Cenolestes obscurus (Ebanorthidæ). 6. Wombat (Phascolomyldæ). 7. Common phalauger; 7a, Three-striped phalauger (Phalangeridæ). 8. Great gray kangaroo (Macropodidæ).

orders of Polyprotodontia and Diprotodontia, the distinction being based on the number of the front (incisor) teeth. In the first order these are numerous, small, and nearly equal, while the canines are large. The teeth generally are like those of the

families-(1) the Didelphyidæ, or American opossums: (2) the Dasyuridæ, containing the dasyures and the thylacine, or Tasmanian wolf; (3) the Notoryctide, a family erected for the very remarkable marsupial mole (Notoryctes typhlops), which has been

spending most of their time in trees, in which the nest is built. Like their allies, they are actively carnivorous and bloodthirsty, preying chiefly upon small birds and mammals. Like their allies also, they are readily tamed if taken young, and have been kept as domestic pets both by ancient and modern peoples. In many cases the fur is valuable, especially that of the northern forms in both hemispheres. The pine marten, or European marten (Mustela martes), is still found in Britain. It reaches a length of about eighteen inches, exclusive of the tail. In the south of Europe this species is replaced by the beech marten, or white-breasted marten (M. foina). In Siberia occurs the most valuable species of all, the sable (M. zibellina), a form nearly allied to the pine marten, as is also the American marten (M. americana). In America also occurs the fisher marten, or Pennant's marten (M. Pennanti).

Martensen, Hans Lassen (1808-84), Danish theologian, was born at Copenhagen; became a professor in the university there in 1838, and in 1854 succeeded J. P. Mynster as bishop of Zealand. A romanticist by nature, Martensen was able to work the mysteries of Christian dogma, and even the high demands of Christian ethics, into a quasi-Hegelian unity with the world. This was the cause of his famous controversy with Kierkegaard, in which the latter carried off the honours, and which may be said to smoulder still among their respective partisans. His best-known works are Den kristelige Dogmatik (1819; trans. Christian Dogmatics) and Den kristelige Ethik (1871-8; trans. Christian Ethics, 1873 and 1881-2). See his Af mit Levnet, an autobiography (Ger., Aus Meinem Leben, 1883); also Briefwechsel, between Martensen and Dorner (1888).

Martha's Vineyard, isl. off S.E. coast of Massachusetts, U.S.A. Several of its villages are summer resorts. Its area is 100 sq. m. Pop. (1900) 4.561.

Martial, MARCUS VALERIUS MARTIALIS (43 to c. 104 A.D.), Roman epigrammatist, was born at Bilbilis in Spain, and came to Rome probably about 63 A.D. About 100 A.D. he returned to Spain, and died there. His epigrams are short poems, in a variety of subjects, but all alike in making some definite witty point. In fact, Martial was the inventor of the epigram in the modern sense of the word; and in neatness, polish, fancy, keenness of observation, and sarcastic vigour he has never been excelled. Two faults have been found with

him—first, that he grossly flattered the Emperor Domitian (but such flattery was a necessity for a society poet); secondly, that many of his pieces are exceedingly coarse (yet more than three-quarters of them are free from any such taint). Editions: Text, Gilbert (2nd ed. 1898); with notes, Friedländer (1886); Stephenson (1888; selecjudicial decisions can alter the fact that the application of military government under the law of necessity, commonly called martial law, must always exist. When a belligerent occupies an enemy's country, the country is either wholly or partially placed under military government. In Britain the essence of



Species of Martens.

1. Pine marten. 2. Sable. 3. Beech marten. 4. Fisher marten. 5. Indian marten.

tions). There is a complete but inferior English translation by Elphinston (1782).

Martial Law is unknown to English jurisprudence; disturbers of the public peace can be found guilty of treason, felony, or misdemeanour, according to circumstances. On the other band, no martial law would be the suspension of the privilege of Habeas Corpus. In the case of disturbances abroad (such as the Jamaica riots in 1865), the governor of the colony, who is the representative of the crown, is the person who proclaims martial law. An act of indemnity would,

if necessary, be passed by Parliament after martial law had ceased in the case of a crown colony, and by the local legislature in the case of a settled colony. Martial law is not retrospective in its action, nor does it extend beyond the proclaimed district. An offender cannot be tried for an offence committed before martial law was proclaimed, nor can he be arrested beyond the limits of the area proclaimed. Martial law should never be kept in force longer than absolutely necessary, and the procedure of military courts should, as far as practicable, be adhered to. During the campaign against the Boers (1899-1902) the greater part of S. Africa was placed under martial law. Minor breaches of regulations were summarily dealt with by authorized officers, while the more serious offences were tried by military courts with unlimited powers of punishment. The procedure laid down for field general courtsmartial was strictly followed. with the addition that all evidence, and the defence, was written out in full in each case.

Martigny, three connected villages (M. Ville, M. Bourg, and M. Combe), canton Valais, Swit-zerland, 24 m. s.e. of the Lake of Geneva, and on the Simplon road into Italy. It is a centre. Pop. (1900) 4,292. It is a tourist



House Martin.

Martin (Chelidon), a member of the swallow family, which always has the metatarsus and toes feathered, and bears white feathers over the rump; the tail is sometimes forked, and sometimes squared. The best-known form is the house-martin (C. urbica) which breeds in Britain. The colouring is black and white in the adult, while the young are sooty-brown. The brown and white sand-martin belongs to a different genus (Cotile).

Martin, five popes. MARTIN I. succeeded Theodore I. as pope in 649. He summoned the first Lateran synod, which dealt with the Monothelite controversy. The canons promulgated by the synod offended the Emperor Constans II., by whose order Martin was arrested (653), and banished to Kherson, where he died in 655. -Martin v. (Otto Colonna) was born about 1368, and was chosen pope at Constance in 1417 during the session of the council which

deposed John XXIII. and set aside the rival claims of Gregory XII. and Benedict XIII., thus ending the long schism. Martin v. died in 1431.

Martin, Bon Louis Henri (1810-83), French historian, was born at St. Quentin. His first books were historical romances; and he published a documentary history of France in 1836; and at the same time was engaged upon his magnum opus, the Histoire de France, the fourth edition of which, in 17 volumes (1855-60), won him the 20,000 francs prize of the Institute. He wrote also a continuation of it, Histoire de la France Moderne (1867 - 85). which does not reach the same high standard. He was elected to the Academy in 1878. See Life, in French, by Hanotaux (ed. 1898), and Mainard and Buquet (1884).

Martin, SIR GEORGE (1765-1847), British admiral, was present at Keppel's action off Ushant in 1778, in Byron's action off Grenada in 1779, and in the three actions fought by Rodney in 1780. He fought in the battle off Cape St. Vincent in 1797, and at the capture of the French Généreux in 1800, and took part in the blockade of Malta in the same year. In 1805 he served under Calder in the action off Ferrol. He became admiral of

the fleet in 1846.

Martin, GREGORY (d. 1582), English Biblical translator, born at Maxfield, Sussex. Unable to conform to Protestantism, he fled to the English college at Douay (1570). Settling at Rheims (1578), he devoted the remainder of his life to the translation of the Bible known as the Douay Ver-

Martin, JOHN (1789-1854), English landscape and historical painter, born at Haydon Bridge, near Hexham, Northumberland. His reputation was established on the appearance of his first pic-ture hung at the Royal Acad-emy, Sadak in Search of the Waters of Oblivion (1812). Critics differ as to his merits as a painter, but his works are bold and original. The best known are Belshazzar's Feast, The Fall of Babylon, and Joshua Commanding the Sun to Stand Still.

Martin, LADY. See FAUCIT, HELEN.

Martin, St. (316-c. 400), bishop of Tours, was born at Sabaria in Pannonia, now Hungary, and served under Constantine and Julian. After leaving the army he entered the church, and being persecuted by the Arians, founded a convent in Gaul (360); but in 371 he was made bishop of Tours. He was renowned for the sanctity of his life, and for the just and moderating influence he exercised in the chaotic politics of

the time. His festival is November 11, and his name appears in the term Martinmas.

Martin, SIR THEODORE (1816), Scottish translator and man of letters, was born in Edinburgh. A lawyer by profession, he settled in London in 1845, and became a leading parliamentary agent. In 1851 he married Miss Helen Faucit, the actress, of whom he wrote a memoir in 1900. With Professor Aytoun he produced the clever parodies and travesties, Bon Gaultier Ballads (1854), and collaborated on a translation of Goethe's Poems and Ballads (1858). He translated from the Danish plays by (Ehlenschläger, namely Correggio and Aladdin (1854-7), and by Hertz, in whose King René's Daughter Miss Faucit found one of her great Other translaopportunities. tions from continental poets are Dante's Vita Nuora (1862), Goethe's Faust (1865-86), Schiller's Song of the Bell, and other lyrics (1889). His fine translation of The Odes of Horace (1860) was followed in 1882 by a complete edition of the Poems, with life and notes; and in 1870 by an admirable monograph on 'Horace,' in Blackwood's 'Ancient Classics.' Catullus appeared in 1861 (2nd ed. 1875), and a translation of Eneid I. VI. in 1896. In 1867 he published a graphic Memoir W. Edmondstoune Aytoun. This was followed by the monumental Life of the Prince Consort (1874-80), The Life of Lord Lyndhurst in 1883, and the Life of the Princess Alice in 1885. In 1906 appeared Monographs: Garrick, Macready, Rachel, and Baron Stockmar.

Martin, SIR THOMAS BYAM (1773 - 1854), British admiral; captured the French Immortalité on Oct. 20, 1798. In 1808 he served in the Baltic, and fought a severe action with the Russian ship Sewolod. From 1815 he was controller of the navy for several years. In 1830 he became an admiral, and in 1849 admiral of

admirat, and in 1945 admirat of the fleet. See his Letters, ed. by Sir R. V. Hamilton (1898).

Martin, William (1801-67).
English writer for children, born at Woodbridge, Suffolk. His books include The Book of Sports (1837), Peter Parley's Annual (1840-67), and The Boy's Own Annual (1861).

Martina Franca, city, prov. Lecce, Italy, 17 m. N.E. of Taranto, with ducal palace and churches. Pop. (1901) 25,287.

Martineau, HARRIET (1802-

76), English miscellaneous writer, was born at Norwich. She wrote a series of tales, as Illustrations of Political Economy (9 vols. 1832-34), followed later by three volumes of Forest and Game-Law Tales (1845-6). These made an immediate success. She visited America in 1834 - 6, but her sympathics with the abolitionists caused the visit to be anyists caused the vanithing but enjoyable. On her return she published Society in America (1837), and Retrospect Western Travel (1838). The of Western Travel (1838). latter half of her life was mainly spent at Ambleside, where she enjoyed the friendship of Wordsworth. She published a fairly successful novel, Decrbrook, in 1839, and Life in the Sick-room (a book which made a strong appeal to many people) in 1843. A scrious illness occurring about this period was practically cured by mesmerism, of which she became an enthusiastic advocate. In this new frame of mind she wrote Letters on the Laws of Man's Social Nature (1851), a work which was the main cause of an estrangement from her brother James. Previously to this she published *The History* of the *Thirty Years Peace* (1849). At this time, too, Comte's philosophy attracted her, and she published (1853) an admirable condensation of his Positive Philosophy. Her Autobiography was published in 1877, and a Life of her, by Mrs. Fenwick Miller, in 1884.

Martineau, JAMES (1805-1900), English Unitarian divine, brother of the preceding, was born in Norwich. In 1828 he was ap-pointed co-pastor of Eustage Street Presbyterian Church, Dublin, and soon after was invited to Liverpool; but in 1840 he was appointed professor of mental and moral philosophy and political economy in Manchester New College, a position which he held for forty-five years. He published the first series of Endeavours after the Christian Life in 1843, and the second in 1847. In 1853 Manchester New College was transferred to London, and Martineau accepted (1858) a call to Little Portland Street Chapel. In 1869 he became principal of the college. After he resigned the principalship, his leisure was occupied with the production of Types of Ethical Theory (1885), Study of Religion (1888), and Seat of Authority in Religion (1890). preacher Dr. Martineau held a high place, and his sermons take rank among the masterpieces of pulpit literature. His permanent influence, however, rests upon his power as a thinker. Martineau agrees with Kant in regard to the part which the mind plays as an instrument of knowledge; he differs from him in denying that the deliverance of the mind in regard to reality is unreliable; and as against Hume he postulates a persistent ego. His philosophy ends in theism—in be-lief in 'a divine mind and will

ruling the universe.' With his natural religion Dr. Martineau unites a mystic spirituality which does not seem justified by his rationalistic creed, and which may largely be the result of his undoubted poetic temperament. See Life by J. Drummond and C. B. Upton (1903), and by J. Estlin Carpenter (1905); and J. Craufurd's Recollections of J. Martineau (1903).

Martinezia, a genus of tropical American palms, with cylindrical trunks and pinnate leaves. They are mostly very beautiful plants, and are cultivated as stove palms. They like plenty of water and a light peaty soil.

Martini, FERDINANDO (1841), Italian writer and statesman, was born at Monsummano, the son of the playwright Vincenzo Marwhose comedies he edited in 1876. He joined the staff of the Fanfulla in 1872, and founded the Fanfulla della Domenica in 1879. In the Giolitti cabinet he was minister of education (1892-93). He edited the Memoirs of Giusti (1890), and the letters of Guerrazzi (1891, etc.), wrote novels, essays, and, above all, the charming proverb-plays, in the style of Musset, and in versi martelliani-Chi sa il gioco non martettant—One sa to gloco non-l'insegni (1871); Ia strada più corta (1871); Il peggior passo è quello dell'uscio (1873). Martini, FREDERIC (1832-97), inventor of the breech action of

the Martini-Henry rifle, was born

in Switzerland. See RIFLE.

Martinique, isl. of Caribbean chain, which culminates in Mont Pelée (4,426 ft.), clothed with forests. Sugar, coffee, cocoa, to-bacco, cotton, and rum (2,014,338 gallons exported in 1905) are the chief products. Total trade in 1905 amounted to £1,321,754. In May 1902 an eruption of Mont Pelée destroyed the commercial capital, St. Pierre (pop. 26,000, all of whom perished in the cruption). Fort de France is the political capital and headquarters of the French navy in the West Indies. Martinique was first settled by the French in 1635. Area, 381 sq. m. Pop. (1901) 203,781. BATTLES OFF MARTINIQUE. (1.)

Between Rodney and the French admiral De Guichen, in April and May 1780, the results being indecisive. (2.) In April 1781 another indecisive action was fought between De Grasse and Sir Samuel Hood.

Martinmas, the feast of St. Martin of Tours on November 11. It is one of the legal terms in Scotland.

Martino, EDUARDO DE, marine painter, born at Meta, near Naples; served in the Italian navy till 1867; took sketches during the Paraguayan war, and painted several pictures for Dom Pedro II. of Brazil. In 1875 he came to England, where he was appointed marine painter in ordinary to Queen Victoria. Among his many works are four pictures of the battle of Trafalgar.

Martino, SIMONE DI (1283-1344), also called Martini, and incorrectly Mammi, Italian painter, was born at Siena; painted with great minuteness of detail, but lacked boldness. Many of his frescoes exist at Siena, Assisi, Avignon, and elsewhere; but many works once assigned to him are by others.

Martinsburg, tn., W. Virginia, U.S.A., co. seat of Berkeley co., 80 m. w. of Washington. Pop.

(1900) 7,564.

Martin's Ferry, city, Belmont co., Ohio, U.S.A., on Ohio, nearly opposite Wheeling, W. Virginia, is in a coal, iron, and limestone region. Pop. (1900) 7,760.

Martinus Scriblerus. See Arbuthnot, John.

Martius, CARL FRIEDRICH

PHILIPP VON (1794-1868), German traveller and naturalist, was born at Erlangen; was attached as botanist to an exploring expedi-

tion to Brazil (1817-20), and published Reise nach Brasilien (3 vols. 1824-31), and Flora Brasiliensis (1840). He was professor (1826) and director (1832) at the Munich Botanic Gardens. Other works by him were Nova Genera et Species Plantarum (3 vols. 1824-32), Icones Plantarum Cryptogamicarum (1828 34), and His-toria Naturalis Palmarum (1823-53), all dealing with Brazil. See Life, in German, by Schramm (1869).

Martos, city, prov. Jaen, Spain, 15 m. W.S.W. of Jaen. Grain, wine, oil, and fruit are produced.

wine, oil, and fruit are produced. There are mineral haths 3 m. distant. Pop. (1900) 17,078.

Martyn, HENRY (1781-1812), English missionary, born at Truro; became chaplain in the East India Company (1805). Near Serampur and at Dinapur and Cawnpur he laboured unceasingly; and though broken in health travelled through Persia to correct his translation of the New Testament (1816) into Persian and Hindustani. He died at Tokat, near Eskishehr in Asia Minor, on his way home to England. He also translated A Compendium of the Book of Common Prayer (1814) into Hindustani, and the Psalms into Persian.

Martynia, a genus of tropical and subtropical American herbaceous plants, belonging to the order Pedalinacea. The flowers are borne in short terminal racemes, and the capsule terminates in two curiously curved beaks. The various species may be grown either as greenhouse plants or as half-hardy plants in warmer and more sheltered localities.

Martyr, one who lays down his or her life for his or her faith. In the early ages of the Christian church there was an enthusiasm for martyrdom, and great honour was paid to martyrs at their festivals. It is denied that the martyrs were ever worshipped, but it was believed that a martyr in prison won the right to obtain pardon for the lapsed, and that the intercessions of the martyr in heaven were of especial value. At first each locality celebrated its own martyrs. Thus Polycarp was celebrated at Smyrna, Cyprian at Carthage, and so on. So each church had originally its own calendar of martyrs. St. Chrysostom (Hom. lxxiv.) mentions a public celebration of all martyrs. This seems to have been on Trinity Sunday, or thereabouts.

MARTYROLOGY. A Depositio Martyrum was in existence in 354. Eusebius alludes to a collection of ancient martyrdoms as having been made by himself. He also wrote On the Martyrs of Palestine, an ancient Syriac version of which has been edited by Cureton. A Syriac Ms. of 412 A.D. was edited by Professor W. Wright in *The Journal of Sucred Literature* (1866), which has 'the names of our lords the martyrs and victors, with the days on which they won crowns. Catalogues are attributed to St. Jerome, which are considered spurious. The Martyrologium Hieronymianum seems to be the source of all the Western calendars which followed it, and the Parrum Martyrologium Romanum adds days for the celebration of the anniversaries of Scripture saints. In the 8th century the Venerable Bede drew up two martyrologies, one in prose and the other in verse. In the 9th century Florus, deacon of Lyons, enlarged Bede's calendar, and brought it up almost to its present condition. Hrabanus Maurus, archbishop of Mainz, drew up a list, which was published by Canisius in Antique Lectiones. Then Ado, archbishop of Vienne, compiled a new martyrology from a manuscript which he found at Ravenna in 857 A.D., and which had been brought thither from Aquileia. In 870 Usuardus, a monk of St. Ger-main-des-Près, compiled a larger and more correct martyrology. This was used throughout the Western church. Early in the next century Notger, or Notker, a monk of St. Gall in Switzer-land, enlarged from Ado's list. None of these lists, however, had any authority, and there any authority, and there was considerable difference in all. In the 15th century Augustinus Belinus of Padua revised the conflicting calendars; and Francis Maruli, or Maurolycus, abbot of

Messina in Sicily, followed him, re-editing Usuardus's text. John van der Meulen, or Molanus, a doctor of Louvain, reverted to Usuardus, editing his list with notes. Galesinus, apostolie pronotary, dedicated a new calendar to Pope Gregory xIII., but it did not secure official recognition. Baronius's martyrology was more widely received, and was sanctioned by Pope Sixtus v. This has since been accepted as the martyrology of the Roman Catholic Church. The Cistercian martyrology was brought out at Rome in 1733 and 1748. The Greek menologion was prepared in the 9th century by the command of the Emperor Basilius, the Macconian, and was edited in 1727 by Cardinal Hannibal Urbini.

Marvell, Andrew (1621 - 78), English poet and politician, was born at Winestead in Holderness, Yorkshire. In 1650 he was chosen Fairfax. In 1653 he was chosen Fairfax. In 1653 he was intro-duced by Milton to Bradshaw, and became a member of the most enlightened and philosophic party in the politics of the commonwealth. After serving as tutor to a nephew of Cromwell, he was chosen to assist Milton in the Latin secretaryship. In 1659 he was elected member for Hull. and succeeded in holding his seat until his death. He was thus enabled to protect Milton from royalist reprisals. In 1663 he accompanied Lord Carlisle on an embassy to Russia, Sweden, and Denmark. In 1667 he began to write his powerfu. satires against the king, the Duke of York, Lord Danby, the Papists, and the High Churchmen. Works: Miscellancous Poems (1680-1); A Collection of Poems on Affairs of State (1689). Prose: The Rehearsal Transposed (1672-3); An Account of the Growth of Popery and Arbitrary Government in England (1677). Collected Works, ed. T. Cooke (1726), ed. Thompson (1776), ed. A. B. Grosart (1872-75), ed. G. A. Aikken (1892). See Birrell's Andrew Marvell (Engrander). write his powerfu. satires against Birrell's Andrew Marvell (English Men of Letters Series), 1905.

Marwar. See Jodhpur. Marx, Heinrich Karl (1818-83), German rocialist, was born at Trèves, of Jewish parents. In 1842 he established at Cologne the Rheinische Zeitung, but it was soon suppressed. From Cologne he migrated to Paris, where he became acquainted with the writings of Proudhon, which converted him to socialism, and formed his lifelong friendship with Engels. The publication of a journal Vorvärts led to his expulsion from France. He took up his permanent residence in London, and, while writing much on current politics, devoted himself chiefly to the

development of his economic ideas. In 1859 there appeared his Zur Kritik der politischen Oekonomie; but it was not till 1867 that he launched the first volume of Das Kapital, which has become the Bible of modern socialism. The second volume (completed by Engels) appeared in 1885, and the third in 1895. Marx created modern socialism: and although subsequent writers have been compelled to modify some of his positions, it is still to Das Kapital that the appeal is made. The book itself is a marvel of erudition. Marx introduced the idea of the industrial revolution which has proved so useful a key to English economic history of the late 18th and early 19th centuries. In 1864 the International was founded, embodying Marx's ideas. Marx himself never held higher office in it than corresponding secretary for Germany; but he was its real head, and inspired all its documents and appeals to the people. In 1872 there was a fierce struggle for control of the International between the adherents of Marx, who claimed to be orthodox socialists, and the more extreme party of anarchists, headed by Bakunin. The struggle ended in the expulsion of Bakunin, and in the crippling of the International, which has never since exercised any influence. See Liebknecht's

Mary 1. (1516-58), queen of England and Ircland, daughter of Henry VIII. and Catherine of Aragon, was born at Greenwich Palace. In 1554 she gave her hand in marriage to Philip II. of Spain. She was in personal danger till Anne Boleyn's death (1536), but was befriended by Jane Seymour. Outdistancing Northumberland in popular favour, she entered London with acclaim; received Pole as papal legate; crushed Wyatt's rebellion with ruthless severity; instituted the miserable persecution of 1555, wherein 300 victims suffered; and lost Calais. See Life by Miss Strickland (1850-9), and History of Edward VI. and Queen Mary.

by Tytler (1839).

Mary II. (1662-94), queen of Great Britain and Ireland, wife of William III., was born in London, daughter of James, Duke of York, and his wife, Anne Hyde. She became heiress-presumptive to the throne (1671), and was married to William, Prince of Orange (1677). She was proclaimed joint sovereign with her husband in 1889.

Mary OF GUISE (1515-60), daughter of Claude, Duke of Guise, was born at Bar-le-Duc. She became the wife of James v. of Scotland in 1538, and was the mother of Mary Queen of Scots.

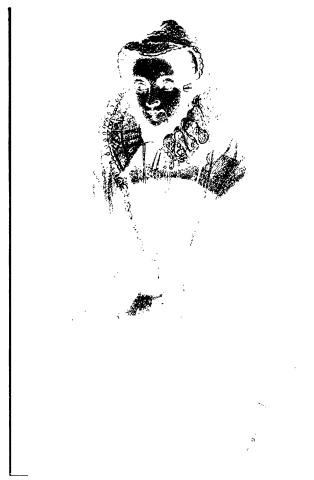
Mary, THE VIRGIN, the mother of Jesus. The particulars given in Scripture regarding her are singularly few. We learn that while she was betrothed to Joseph, a carpenter of Nazareth, the archangel Gabriel announced to her that she was to become the mother of the Saviour; and in due time, while on a visit to Bethlehem, she brought forth her first-born son, conceived of the Holy Ghost. Meanwhile her marriage with Joseph had taken place; and after the Child's circumcision in the temple, the family sojourned for a little in Egypt, afterwards settling at Nazareth (Matt. 1:2; Luke 1:2). After this we have only occasional glimpses of Mary: the finding of Jesus in the temple (Luke 2:41-51); the marriage at Cana (John 2); the visit to Jesus at Capernaum (Mark 3:31, f.); the crucifixion (John 19:25-27), after which she lived in the house of John; finally, a brief reference in Acts 1:14. Around this slight mucleus, however, there gathered many imaginary details about the Virgin, as set forth in the Protevangelium Jacobi, Evangelium Thome, and Historia de Nativitate Marie. Her death is variously put at two, eleven, twenty-two, or thirty-three years after the resurrection, and her supposed tomb lies immediately to the north of Gethsemane, though her body is said to have been carried to heaven by angels. For later thought about Mary and her worship, see MARIOLATRY. See also Clark's Ante-Nicene Christian Library, vol. xvi.; Lignori's Glories of Mary (1868); Tyler's Romish Worship of the Virgin (1844); Von Lehner's Die Marienrerehrung in den ersten Jahrh. (2nd ed. 1886); Mrs. Jamicson's Legends of the Madonna (1852); Underhill's The Miracles of our Lady Saint Mary (1905).

Mary Queen of Scots (1542-87), only daughter of James V. of Scotland and Mary of Guise, was born in Linlithgow Palace, and became queen when only a week old. All the more important years of her early life were spent in France, where she was edu-cated with the royal children under the direction of Margaret, sister of Henry II. In 1558 she was married to the Dauphin. On the death of Mary of England in November, she formally claimed the succession to the English crown on the ground of Elizabeth's illegitimacy. The death of her husband on Dec. 5, 1560, led to her return to Scotland. At first she left the administration of affairs in the hands of Lord James Stewart, her brother, and of Maitland of Lethington. By their advice, she did her utmost to secure the friendship of Elizabeth,

with the view of being personally recognized as her successor.

Necessarily much depended on Mary's choice of a husband. Elizabeth's offer to her of her own lover Leicester may not have been seriously meant. In opposition to the protests of her brother, whom in 1562 she had created Earl of Moray, and greatly to the alarm of the extreme Prot-

this, the increasing influence of Bothwell introduced a new occasion of discord. Mary's political necessities had compelled her to have recourse to the aid and almost protection of this adventurous and unscrupulous noble. Everything favoured the rapid growth of her passionate devotion to him, and riddance from Darnley became a matter of prime



Mary Queen of Scots.
(From the portrait in the possession of the Earl of Morton.)

estants, Mary gave her hand to Darnley, on July 29, 1565. On account of his lack of character and ability. Darnley found himself suddenly superseded in Mary's counsels by the Italian Rizzio; and by lending his aid to the conspiracy for Rizzio's assassination (March 9, 1566), he gave his wife offence that was almost beyond pardon. In addition to

importance to both. Who were mainly responsible for the suggestion of the assassination cannot now be exactly determined; but Bothwell undertook the main arrangements for its accomplishment. Mary—whether the evidence of the casket letters he admitted or not—seems to have been aware of the preparations; and though the chief Protestant

leaders appear to have had no direct share in them, Bothwell counted, not without reason, on their connivance. The tragedy took place in the Kirk o' Field on Feb. 10, 1567. Besides conniving at the murder, the Protestant leaders co-operated—either passively or actively-with Mary in arranging that the trial of Bothwell should result in his acquittal. But after her marriage to Bothwell on May 15, they took up arms avowedly to deliver her from him. This resulted in her surrender to them at Carberry Hill on June 15, after an agreement that Bothwell should be allowed to pass in safety from her presence. Mary was escorted as a prisoner to Edinburgh; and after much debate -- a few being urgent for her summary execution-she was sent to the castle of Lochleven. Here an attempt was made to induce her to agree to a divorce from Bothwell. To this she resolutely refused compli-ance, and being thereupon threatened with a trial, she, rather than undergo it, agreed to the demission of her crown, on June 24.

With the help of George Douglas (brother of the laird of Lochleven), who had fallen under the spell of her fascination, Mary, on May 2, 1568, escaped from Lochleven. Her forces were, however, on the 13th, defeated at Langside, and Mary fled across the Solway into England. Nervous as to the legitimacy of her own sovereignty, and in constant dread of the machinations of her for-midable rival, Elizabeth -- no matter what the wrongs or rights of Mary's cause - could hardly be expected to permit her to regain her freedom. That Mary claimed to be the lawful sovereign of England was probably a sufficient legal justification for her detention; but, in accordance with the ancient pretensions of the English sovereigns to the overlordship of Scotland, Elizabeth perhaps preferred to regard herself as Mary's legal guardian. Very soon also the plot for Mary's marriage to Norfolk, which was combined with a conspiracy for a Roman Catholic rising in her favour, brought vividly home to Elizabeth the dangers that might result from Mary's liberation.

Other thirteen years and more were spent by Mary as a prisoner—at Sheffield, until Aug. 25, 1583; at Wingfield, until the beginning of 1585; at Tutbury, until Aug. 25, 1586; and at Fotheringay, until her execution. That she gave her full assent to the Babington conspiracy, in the spring of 1586, against Elizabeth's life, is almost certain; but it is quite certain that the English government were glad of the opportunity it afforded them for obtaining a feasible pre-

text for her execution. But for several months Elizabeth delayed the enforcement of the death penalty. Mary mether fate (Feb. 8, 1587) with unshaken fortitude. Almost from her cradle to her grave, Mary had to contend with a variety of influences hostile to happy issues; and latterly, even the strongest excellences of her nature became, by a curious concatenation of untoward circumstances, lengued with her weaker characteristics in accomplishing the tragedy of her undoing.

Amongst the more important contemporary records are the histories of Knox, Leslie, and Buchanan, Sir James Melville's Mcmoirs (Bannatyne Club), Lord Herries's Memoirs (Bannatyne Club), and the History of Mary Stuart, by Claude Nau (ed. Stevenson, 1883). Mary's Letters (ed. Labanoff) appeared in 7 vols. in 1844; but various others of importance have since been discovered. For the principal works relating to the Casket controversy, see Casket Letters. principal modern Lives are those by Chalmers (2 vols. 1818; 3 vols. 1822), Bell (1840 and 1889), Mignet (1851), Agnes Strickland (1873), Skelton (1893), MacCunn (1905), and Henderson (1905). Other works are M. Philippson's Histoire du Règne de Maric Stuart (3 vols. 1891-2); Rait's Mary Queen of Scots (1899); Pollen's Papal Negotiations with Mary Queen of Scots (Scottish History Society, 1901); A. Lang's History of Scotland (vol. ii. 1902); and Martin Hume's Love Affairs of Mary Queen of Scots (1903). Amongst the more interesting studies of Mary's character are those by Sainte-Beuve in the Galcric des Femmes Célèbres, and of Mr. Swinburne in the Enculopædia Britannica (9th cd.).

Maryborough. (1.) Municipal town, Talbot co., 112 m. by rail N.w. of Melbourne, Victoria, Australia; is a railway centre. Gold is mined, and it has railway workshopsand engineering works. Pop. (1901) 5,633. (2.) Town, Queensland, Australia, March co., 180 m. N. of Brisbane by rail, the centre of a gold, coal, timber, and sugar district. Pop. (1901) 10,159.

Maryland, an eastern state of U.S.A., with an area of 12,210 sq. m. It was one of the thirteen original states. That portion E of Chesapeake Bay, called the Eastern Shore, is low and level, with large marshy tracts. On the other side of the bay the land rises westward, and becomes rolling. The narrow westward extension of the state is crossed by the ridges of the Appalachian Mts. The principal river is the Potomac. The capital is Annapolis, and the chief city and seaport is Baltimore. The chief in-

dustries are clothing, foundry and machine shops, and tobacco factories, iron and steel works, slaughtering and meat-packing, flour mills, and the manufacture of cotton goods, cars, confectionery, and beer. The mineral wealth consists mainly of coal. Pop. (1900) 1,188,044; 7'9 per cent. being foreign, and 19'8 per cent. negroes.

Marylebone. See LONDON. Mary Magdalene, one of the associates of Jesus and His disciples. Her name suggests that she belonged to the town of Magdala, now Mejdel, near Tiberias. Her zeal in the cause of Jesus was probably the outcome of her gratitude for His having cast out of her seven demons (Luke 8:2), and she was rewarded by being the first to witness His resurrec-tion (Mark 16:9). She has been identified with the sister of Lazarus, the sinner of the city (Luke 7:37 f.), and the daughter of the Syrophanician woman (Mark 7:26 f.); while Eusebius hazards the theory that there were two of her name and desig-Her legendary life is nation. set forth by Hrabanus Maurus (9th century), and more fully by Vincent of Beauvais (13th cen-Our Magdalene asylums tury). Our Magdalene asylums derive their name from her, not on unimpeachable authority.

Maryport, seapt, Cumberland, England, 28 m. w.s.w. of Carlisle. Industries include iron works, sawmills, shipbuilding, and coal mines. There is a good harbour and deep-water docks. The value of the port trade exceeds £1,000,000. North-east of the town is the site of the Roman Virosedum. Pop. (1901) 11,896.

Masaccio, whose real name was TOMMASO GUIDI (1401-28), Florentine painter, was born near Florence. His shyness and careless habits gained him the name Masaccio ('lubberly' or 'slovenly'). He began in 1423 the famous frescoes in the Carmelite church at Florence, which mark an important stage in Italian painting. See monograph by Schmarsow (1895-1900).

Masalland, region, E. Africa, stretches west to Victoria Nyanza, and is traversed N. to S. by a remarkable volcanic fault. In the s. are Lakes Naivasha and Baringo, and in the N. Lake Rudolf. The chief mountains are Kenia, Kilima-Njaro, and Aberdare. The Masai are a nomad people, fundamentally Gallas, greatly modified by contact with negro and Bantu populations. Their power was broken by the loss of their cattle during the epidemic of the 'ninetics. They have now accepted British rule. See J. Thomson's Through Musailand (1885); S. L. and H. Hinde's The Last of the Masai (1901); J. W. Gregory's

The Great Rift Valley (1896); Merker's Die Masai (1904); and A. C. Hollis's The Masai C. Hollis's (1905).

Masaniello (1622-47), whose full name was Tommaso Aniello, a Neapolitan fisherman, led the revolt of Naples in 1647 against the cruel exactions of the Spanish government. A dispute arose over payment of a tax on fruit; the Neapolitans, under Masaniello, took up arms, and for a week he was master of the city. Excitement turned his head. He was confined in a monastery and assassinated.

Masaya, tn., Nicaragua, Central America, 40 m. N.W. of Nicaragua; produces tobacco. Pop. 20,000.

Mascara, or Maskara, fort. tn., dep. Oran, Algeria, 45 m. S.E. of Oran. The trade is chiefly in wine, oils, and cereals. The place was burned by the French in 1835, and finally taken by Marshal Bugeaud in 1841. Pop. (1901) 18,405.

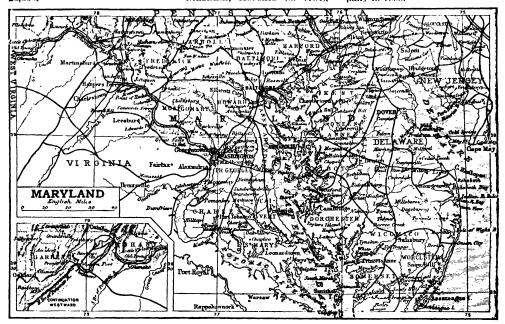
Mascarene Islands, the general name applied to Bourbon or Réunion, Mauritius, and Rodriguez, lying to the E. of Madagascar. So called because Ré-union was discovered by the Portuguese navigator Mascarenhas in 1545.

Masdevallia, a genus of cool-house orchids of epiphy tal habit, mostly natives of South and Central America.

Masham, ABIGAIL (d. 1734),

Mashonaland, region of S. Rhodesia, British S. Africa, between Matabeleland and the Zambezi. It is an upland savanna country (alt. 3,000 to 5,000 ft.) with a fertile soil, and is intersected by tributaries of the Zambezi and the Sabi. The climate is good for Europeans. Gold was found in early times (see ZIM-BABWE), and is still worked. The chief settlements are Salisbury (seat of the administration), Umtali, Victoria, and Hartley. railway connects Beira, on the E. coast, with Salisbury; and there is also railway communication between Salisbury and Bulawayo. Mashonaland was acquired by the British South Africa Company in 1893.

Mashonaland



Masbate, isl., Philippines, 30 m. s. of Luzon. Length, 82 m.; average breadth, 15 m. Area, 1,731 sq. m. Masbate is mountainous and wooded. The principal industries are lumbering, fishing, and the manufacture of palm mats. The capital is Masbate. Pop. (1901) 23,000.

Mascagni, PIETRO (1863), Italian operatic composer, born at Leghorn. From 1895 to 1903 he was director of the Rossini conservatory at Pesaro. He is best known by his popular opera. Cavalleria Rusticana (1890), the libretto of which is an adaptation of Giovanni Verga's Novelle Rusticane (1883). He has produced also L'Amico Fritz (1891), I Rantzau (1892), and other operas.

first cousin of Sarah Jennings, Duchess of Marlborough, by whose influence she became bedchamber-woman to Queen Anne. Eventually she supplanted the duchess in the queen's favour, and was an intermediary between Anne and the Tories.

Masham, Samuel Cunliffe LISTER, FIRST LORD (1815-1906). English inventor, was born near Bradford, where he spent his life as a woollen and silk manufacturer. His principal inventions were a practical wool-combing machine, a machine for enabling waste silk to be spun, and an improvement in the velvet loom. He published Lord Masham's Inventions by Himself (1905); and was given a peerage in 1891.

The Mashonas (Ama-Swina), a Bantu people, belonging to the same stock as the Makalakas, were the dominant people in the empire of the Monomotapas. In recent times the Mashonas proper suffered much from the raids of the Matabili, and were compelled to lead the life of troglody tes in their mountain fastnesses before the establishment of orderly govern-ment by the British South Africa Company in 1893. They are ment by the British South Airica Company in 1893. They are herdsmen, agriculturists, spinners, weavers, potters, and iron forgers. The population was 391,590 in 1905. See H. Hensman's History of Rhodesia (1900), W. M. Kerr's The Far Interior (2 vols. 1886), and R. N. Hall's Great Zimbahne (1905). Great Zimbabwe (1905).

Masinissa, king of the Numidians. In the second Punio war he was at first on the Carthaginian side, but afterwards joined the Romans. The Carthaginians and Syphax, king of the Massylians, pressed him hard until Scipio invaded Africa in 204 B.C. In 202, at the decisive battle of Zama, Masinissa commanded the cavalry of the right wing. After the conquest of Carthage, he received most of Syphax's territory, and reigned till 148 B.C.

Mask, a covering for the face, generally grotesque. Savage tribes have used them to frighten their enemies or evil spirits. story of the Gorgon's head is probably a myth of the mask. In ancient Greece masks were used at the feasts of Bacchus and on the stage, the invention for the latter purpose being assigned to Æschylus. They represented different ages and types of character, and were fitted with a voice tube to increase the power of the actor's elocution. In Italy masks were worn in the 16th century in comedy, and they still survive in pantomime. Modern masks are chiefly manufactured in Paris. The word has many secondary meanings -c.g. death mask, fencing mask. In architecture and painting it signifies a face without a figure. For the play so called, see MASQUE. See Dall's Masks and Labrets (1885); Sand's Masques et Buffons (1869); A. B. Meyer's Masken von New Guin e (1889).

Maskelyne, NEVIL (1732-1811), English astronomer-royal, was born in London. He travelled to St. Helena to observe the transit of Venus of June 6, 1761; succeeded Bliss as astronomer-royal in 1765; founded the Nautical Almanace in 1767, and superintended its publication during forty-five years. In 1774 he experimented on the deviation of the plumb-line near Mount Schiehallion in Scotland, for the purpose of ascertaining the earth's density, and published in 1790 a catalogue of thirty-six fundamental stars.

Mason, city, Iowa, U.S.A., co. seat of Cerro Gordo co., 115 m. N.N.E. of Des Moines. Pop. (1900) 6,746.

Mason, George Heming (1818-72), English painter, was born at Wetley, Staffordshire; went when twenty-seven to Italy, and studied painting in Rome. In 1853 Lord Leighton met him, and encouraged him both in Rome and in England. He was elected an R.A. in 1868. His work depicts rural English scenes, truthful, simple, idyllic. His art has exquisite qualities of pastoral rest and beauty, a pathetic tenderness and sadness peculiar to himself.

Mason, John (1586-1635), founder of New Hampshire, was born at King's Lynn, Norfolk. He was appointed governor of Newfoundland (1615), and published A Briefe Discourse on the Newfoundland (1620).

Mason, SIR JOSIAH (1795 1881), English philanthropist and manufacturer, was born at Kidderminster. From selling cakes in the street he rose to be one of the largest pen-makers, and partner with the Brothers Elkington in electro-plating. He founded almshouses and an orphanage at Erdington, and a scientific college at Birmingham.

Mason, WILLIAM (1724-97), English poet, was born at Kingston upon - Hull. He became canon of York in 1762. His Muscus (1747), a lament for Pope, attracted Gray's attention. He published Gray's Life and Letters (1774); and among his other works were two plays Elfrida (1752) and Caractacus (1759), and the Heroic Epistle (1773), a satire.

Mason and Dixon's Line settled a long dispute between William Penn and Lord Baltimore in regard to the boundary of the two colonies, Pennsylvania and Maryland. In 1760 the matter was referred to two English surveyors, Charles Mason and Jeremiah Dixon, who ran (1767) a line as it is at present. In 1901 a new survey was begun. The phrase 'Mason and Dixon's Line' is often used in United States history to indicate the general division, prior to the civil war, between the free states (N.) and the slave-owning states (S.)

Masonry, the art of construction in stone. (See also BUILDING.) The foundations on which a building is supported must be designed according to the nature of the strata underneath the surface. If solid rock or hard boulder clay be met with, the walls can be commenced at once; if, however, it be a compact subsoil, large flat stones or concrete with a larger superficial area than the walls must be inserted, so as to distribute the pressure over a larger surface. In very soft or marshy ground piles must be driven, with transverse and longitudinal beams spiked to the top, and the concrete foundation course laid above.

The outside walls of buildings may be constructed in various forms of masonry, from ashlar, which is built of squared blocks of stone neatly fitted and bonded together, to rubble, composed of irregular-shaped stones built in the roughest manner possible. The most important is coursed ashlar,' in which the blocks are of uniform height in each course, each stone being in length not more than three times its depth, while the vertical joints break

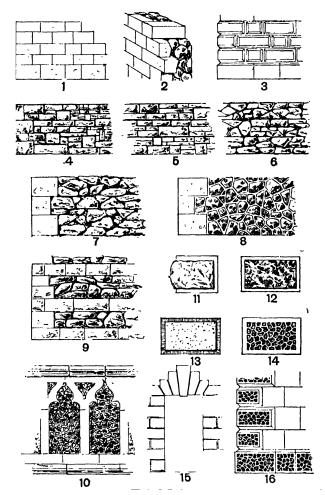
bond with the courses above and below. In 'rubble ashlar' the outside face is ashlar work, but the remaining depth of the wall is composed of rubble work. In each superficial yard of facework one of the ashlar stones should be the full thickness of the wall, and is termed a header. In 'squared rubble' the face stones are of unequal size, but are neatly squared and dressed. Headers project two-thirds through the wall from back and front alternately so as to bond it together. There should be two in each superticial yard. In all classes of masonry stones should be laid on their natural bed. A 'string course' is a course of large stones slightly projecting beyond the face of a building, and dressed and built like ashlar or block-in-course. In engineering, ashlar masonry is used chiefly for the piers, abut-ments, arches, and parapets of bridges, and for facings, quoins, etc. of inferior masonry, 'Blocketc., of inferior masonry. 'Block-in-course' masonry, which is practically ashlar of smaller stones, is used for spandrels and wing-walls of bridges, the facing of retaining walls, etc. 'Face work' is the term applied to the manner in which the external stonework is dressed, and is of a variety of forms: 'polished work,' in which the exposed faces are brought to an absolutely smooth surface by rubbing with water and sand; droved work, in which the surface after being dressed is finished in parallel ribbed lines by means of a stone chisel; 'stugged work,' in which the surface is finished with a sharp-pointed chisel so as to have the appearance of small hollows uniformly over the face; hammer-dressed work, in which the surface is roughly dressed, the projection being in no case more than one inch; 'rustic work,' an exaggerated form of the last, which requires a considerable amount of work in order to give the surface the appearance of a rough rocky face. See Purchase's Practical Masonry (5th ed. 1904).

Maspero, GASTON CAMILLE CHARLES (1846), French Egyptologist, was born at Paris; became professor of Egyptology at the Collège de France in 1873. In 1881 he was appointed to succeed Mariette as director of explorations in Egypt, and keeper of the Bulak Museum. He carried out important excavations, but re-turned to the duties of his chair in 1886. His works include Manual of Egyptian Archwology (Eng. trans. 5th ed. 1902); Histoire Ancienne des Peuples de l'Orient (6th ed. 1904; Eng. trans. Dawn of Civilisation, 4th ed. 1901); Histoire Ancienne des Peuples de l'Orient Classique (1895-99; 6th ed. 1904); and articles in Revue de l'Histoire des Religions.

Masque, cr MASK, a form of semi-dramatic entertainment, in which a large part is played by singing and dancing. Promiscusinging and dancing. Promiscu-ous 'mumming,' or 'disguising' with 'visors,' was forbidden in London civic orders of the early 15th century. The custom was, however, retained as a form of Christmas revels. It was the custom for the mummers to enter the hall and call on the guests to dice and dance with them. Originally this was perhaps done in dumb show, but in time dialogues and songs were used, and several examples are amongst the verses of Henry VI.'s court poet, John Lydgate. The Tudor kings had sumptuous masques, with elaborate dresses and pageants or enanorate dresses and pageants or structures of painted carpentry of allegorical design on which the performers entered. The actual term 'mask' is first used in 1513, and before long sup-planted both 'mumming' and 'disquising' Under James 1 and disguising. Under James I. and his successor the masques were lavishly ornamented, Inigo Jones being usually employed to design them, while the music was entrusted to Henry Lawes, and the dialogue and songs to Ben Jonson or some other poet. The dance continued to be the central feature of the entertainment, and the masquers were the lords and ladies of the court. The subject-matter was generally mythical, pastoral, or allegorical; but Jonson was fond of introducing what he called an 'antimasque,' in which the characters, for the sake of contrast, were grotesques. Jon-son is by far the greatest of English masque writers. His elaborate devices contain the daintiest poetry and the most ingenious crudition. Twenty-two are extant, including The Masque of Blackness (1605), The Masque of Beauty (1608), Oberon (1611), of Beauty (1903), Various (1616), The Golden Aye Restored (1616), The Masque of Augurs (1622), Pan's Anniversary (1623). Other masque writers are Samuel Daniel, with The Vision of the Twelve Goddesses (1604) and Tethys' Fes-tival (1610); Thomas Campion, with The Lords' Missauc (1613); William Browne, with the Inner Temple Masque (1617); Thomas Carew, with Colum Britannicum (1634); James Shirley, with The Triumph of Peace (1634); and John Milton, with Comus (1634). The influence of the masque may be traced in the spectacular visions introduced into some of Shakespeare's plays and in the whole conception of A Midsummer Night's Dream. After the re-storation the temper of the masque was continued in the new dramatic type of opera. See A. W. Ward's English Dramatic Literature (1875, 1899); E. K. Chambers's Mediæval Stage, ch. xvii.

(1903); Soergel's Die Englischen Maskenspiele (1882); Evans's English Masques (1897, with specimens); Brotanek's Die Englischen Maskenspiele (1902).

Masquerade, a ball or other entertainment where masks are worn. In early times connected a special kind of play. (See MASQUE.) Masquerading was forbidden in France (1535) owing to its abuses, but was very popular with Louis XIV. It was again proscribed by the republicans (1789). The masquerades of San Angelo, near Mexico, are famous.



Styles of Masonry.

1. Coursed ashlar. 2. Ashlar backed with rubble. 3. Ashlar with rebated joints and moulded edges. 4. Squared rubble. 5. Coursed squared rubble. 6. Coursed random rubble. 7. Random rubble with ashlar quolins. 8. Random rubble pointed with cement mortar. 9. Random rubble with ashlar bands. 10. Split flint work. 11. Rock-faced quolin with drafted margin. 12. Hammer-dressed stone with drafted margin. 13. Picked or punched face. 14. Verniculated work. 15. Window opening, showing arrangement of stones in lintel. 16. Wall with rusticated quoins and plinth.

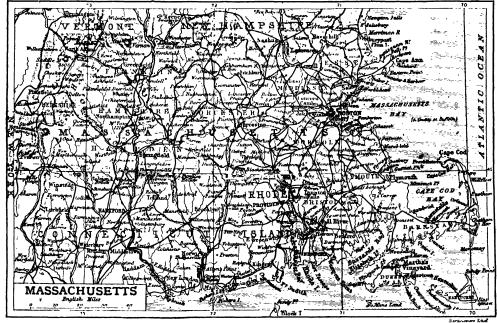
with religion, it was afterwards discouraged by the fathers of the church. Originating in Italy, the masquerade was introduced into France by Catherine de' Medici; it reached England in Henry VIII.'s time, and flourished under Elizabeth, giving rise to

Mass, the magnitude which is inseparably associated with each and every particle of matter when it is to be made the object of dynamical discussion. Newton called it the quantity of matter. See DYNAMICS, KINEMATICS, KINEMATICS, KINEMATICS.

Mass (Lat. missa), a once universal term for the liturgy or office for the celebration of the eucharist. The title of the English reformed Prayer Book of 1549 was 'The Holy Communion, commonly called the Mass.' The title as applied to the holy communion is found in an epistle of St. Ambrose. The ancient liturgies were divided into two parts—the first open to persons who were being prepared for baptism, and called the mass of the catechumens; the second open only to the baptized, and known as the mass of the faithful. The first dismissal, that of the catechumens, took place immediately after the sermon. The faithful received their dismissal

objectionable secular subjects and complex contrapuntal devices of an absurd nature, that the Council of Trent (16th century) had almost decided to prohibit the use of all polyphonic music in the services of the church. The situation was saved by the publication of Palestrina's celebrated Missa Papa Marcelli, which showed that supremely technical polyphonic music might be permeated with the essential qualities of reverence and solemnity. Near the close of the 17th century the introduction of instrumental accompaniment, and the subsequent adoption of the system of tonality, resulted in the mass becoming a form of sacred cantata, which in some instances

Massachusetts, a N.E. state of U.S.A., lying between 41° 30′ and 42° 55′ N. and 70° and 73° 30′ W. Area, 8,040 sq. m. It was one of the thirteen original states. On the E. and S.E. it borders on the Atlantic, with a broken and uneven coast, rocky in the N., but low and sandy in the S. Inland the country gradually rises to Greylock Mt., in the N.W. (3,500 ft.). Much of the detail of relief is due to the erosion and deposition of the Laurentian glacier—e.g. the numerous lakes and ponds which diversify the surface. Agriculture, which was the leading industry of Massachusetts half a century ago, is to-day of much less importance. The principal crops are Indian



after the final benediction. Any service was once called miss, and in the 6th century in Spain and Gaul 'evening masses' meant evensong, and not the eicharist.

Mass, MUSIC OF. From the latter part of the 14th century the form of musical composition termed a mass has consisted of six movements—viz., the Kyrie, Gloria, Credo, Sanctus, Benedictus, and Agnus Dei. The whole work is usually founded upon a single theme—termed a canto fermo—which is frequently the melody of one of the ancient unisonal plain chants used in the service of high mass from a remote period. At one time the music of the mass became so vitiated by the incorporation of

approximates to the proportions of an oratorio. The present Pope, however, has enforced greater simplicity in church music.

Massa, city, cap. of prov. Massa e Carrara, Tuscany, Italy, near Gulf of Genoa, 26 m. N.W. of Pisa. It has a fine ducal palace, and is a centre of the famous Carrara marble industry. Its manufactures include silk, paper, olive oil, cotton, and tobacco. Pop. (1901) 26,118.

Massachusetts, N. American aborigines, a branch of the extinct Natic nation, who were members of the Algonquin family, and inhabited the above state. Their language survives in the Bible (17th century) of John Eliot, 'the apostle of the Indians.'

corn, oats, fruit, potatoes, to-bacco, and hay. The fisheries are of considerable but diminishing importance, Gloucester being the headquarters. The state has quarries of building stone. The manufacturing industries are of paramount importance, the principal being boots and shoes, cotton goods, clothing, woollen goods, foundry and machine-shop products, leather, printing and publishing, worsted goods, paper, slaughtering and meat-packing, sugar-refining and shipbuilding. Boston is the leading seaport. Pop. (1900) 2,805,346. The density was 348 to a sq. m., which makes Massachusetts the most densely populated state in the Union, with the exception of Rhode I.

Massafra, tn., prov. Lecce, Italy, 12 m. N.W. of Taranto; trades in wine, cotton, and fruits.

Pop. (1901) 11,200.

Massage, a general term for various movements, made for curative purposes, mostly by the hands of the operator or masseur, over the surface of a patient's body, head, or limbs. The gen-eral result of massage is to hasten tissue metabolism, the constant change of destruction and repair going on all over the body, and to equalize the distribution of the blood by facilitating its flow. Careful massage is of great use in neurasthenia and all allied nervous disorders, and should in some cases form the only exercise for a time, the patient being confined to his bed. Later it is followed by 'passive movements,' the patient being entirely passive, while the operator moves his limbs for him. Later still the patient may offer a certain amount of steady resistance, or may perform movements while the operator resists. Thus massage may lead the way to ordinary exercise. Massage acts very successfully on the nervous system in cases of insomnia, neuralgia, and sciatica. This may be partly due to the equalized flow of blood, bringing fresh nutriment to the nerve-cells and removing waste products; partly also to the semihypnotic effect produced by gentle, steady, regular strokes, or to the stimulating effect of brisk rubbing. In surgical cases massage is of service in helping to break down adhesions about joints, to reduce chronic thickenings, and to help repair and avoid wasting of muscle when fractures prevent active move-ment of a limb. Many surgeons now make it their practice to use regular daily massage on a limb within a day or two of a fracture, the splints being removed, and the limb steadied by grasping above and below the point of injury.

Massagetæ, ancient Asiatic people of Scythian race, who lived near the Sea of Aral. It was in an expedition against them that Cyrus the Great met

his death.

Massa-Marittima, tn., prov. Grosseto, Tuscany, Italy, 28 m. s.w. of Siena; has a beautiful cathedral. Here are mines of iron, lignite, copper, and zinc. (1901) 17,519.

Massangea, a genus of tropical herbaceous plants belonging to the order Bromeliaceae. A few species are grown as stove plants.

Massena, Andre, Duc de Rivoli (1758-1817), French mar-shal, was born at Nice. In 1792 Massena, a man of humble birth, showed such military skill that in 1793 he was made general of division. In the Italian campaign of 1796 he proved one of Bonaparte's most useful coadjutors. By his victory at Zürich (1799) over the Russian Korsakov, Masséna prevented a junction between that general and the victorious Suvarov, who had marched over the St. Gothard. Masséna's defence of Genoa in the later part of the war was a brilliant achievement. After the peace of Lunéville, Masséna (then a marshal, and in chief command of the army in Italy), though defeated at Caldiero, pursued the Archduke Charles into Austria. In 1806 occupied the kingdom of Naples, and in 1807 took part in the war against Russia. In 1808 he was sent to Spain, but in 1809 he was recalled to serve against Austria. His skill and courage at the battle of Aspern (or Essling) were rewarded by the title of Prince of Essling. From 1809 to 1812 Masséna opposed Wellington in Spain. In 1814, while commanding at Marseilles, he declared for Louis XVIII. During the hundred days he supported Napoleon, and, as commander of the National Guard, kept order in Paris. See his Mémoires (ed. Koch, 1849-50); Life, in French, by Toselli (1869); Gachot's Histoire Mit-taire de Musséna (1901, etc.); and Beauregard's Le Maréchal Masséna (1902).

Massenet, Jules Émile Fré-DÉRIC (1842), French musical composer, born at Montaud, near St. Etienne. In 1863 he won the Prix de Rome; but it was the production of his opéra comique, Don César de Bazan (1872), that placed him in the first rank of French composers. Among other important works are his oratorios, Marie Madeleine (1873), Eve (1875), and La Vierge (1879); his operas, Roi de Lahore (1877), Manon Lescaut (1884), Esclar-Manon Lescaut (1884), Esclar-nonde (1889), La Navarraise (1894), Sapho (1897), Griseldis (1898), Le Jongleur de Notre-Dame (1992), and Chérubin (1995). He has also published orchestral suites, pieces for piano, and songs. In 1878 he was appointed professor of composition at the Paris Conservatoire. See Solenière's Mas-

senet, Etude Critique (1897). Massey, GERALD (1828), English man of letters, was born at Gamble Wharf, near Tring, Hertfordshire. In 1848 he be-Hertfordshire. In 1848 he became editor of the journal Spirit of Freedom, and soon after was appointed a secretary of the Christian Socialists, which made him acquainted with Maurice and Kingsley. He furnished the model for George Eliot's Fclix Holt, Radical. Popular as a lec-turer, Massey completed in 1873 a tour in the United States, where some extravagant theological

views proved both offensive and amusing. He published Voices of Freedom and Lyrics of Love (1851): Bullad of Babe Christabel, and other Poems (1854); Craigerook Castle and War Waits (1855); Robert Burns, and other Lyrics (1859); Havelock's March (1861); Tale of Eternity (1869). In 1890 appeared a collected edition in two volumes, entitled My Lyrical Life. Massey has a fine lyric sense, and despite occasional exaggerations in sentiment and in imagery, both his vigour and his pathos are legitimate and sure. His speculative tendency produced his ingenuous if unconvincing Shakespeare's Sonnets never before Interpreted (1866); Concerning Spiritualism (1871); A Book of the Beginnings (1881); Natural Genesis (1883); The Secret Drama of Shakespeare's Sonnets (1888). See Life by Flower (1895).

Massicot (lead monoxide, PbO) occurs native, but is chiefly prepared by heating lead, or white lead, in air to a temperature below the point of fusion of the product. It forms a brownish-yellow solid (sp. gr. 93, m.p. about 600° c.), which is mostly used for the preparation of red lead by further roasting in air.

Massillon, city, Stark co., Ohio, U.S.A., 50 m. s.E. of Cleveland. It has coal fields, iron works, and blast-furnaces. Pop.

(1900) 11,944.

Massillon, JEAN BAPTISTE (1663-1742), French preacher, was born at Hyères. In 1681 he entered the congregation of the Oratory, and at once attracted attention by his rhetorical gifts. Cardinal de Noailles made him in 1696 director of the seminary of Saint Magloire at Paris. In 1699 he preached before the court, and again in 1701 and 1704. He also preached the funeral orations of the Prince de Conti (1709), the Dauphin (1711), and Louis XIV. (1715). He was made bishop of Clermont in 1717, and in 1718 preached the Petit Carême before the king. In 1719 he was admitted to the Academy. Singular charity and benevolence engrossed his remaining years. His suavity and grace-fulness of style have made his sermons popular, but he has neither the fire and dramatic movement of Bossuet nor the classic severity of Bourdaloue. Nor can his splendid amplifications conceal his lack of originality and paucity of thought. His *Euvres* (1745) appeared in 4 vols. See D'Alembert's *Eloge de Massillon* (1817); Bayle's *Massillon* (1967), F. Bayle's lon (1867); F. Brunetière's L'Eloquence de Massillon (1881); Allan's Massillon (1883); Cohendy's Correspondance, etc., de Massillon (1883).

Massinger, Philip (1583-1640), English dramatist, was born probably at Salisbury. In 1606 he came to London and wrote plays. Much of his work was done in collaboration with Tourneur, Dekker, and above all, between about 1613 and 1625, with Fletcher. His individual pieces have ingenious plots, often taken from the Italian or Spanish, but the handling is rhetorical and often gross. story, based on internal evidence, that at one period of his life he became a Roman Catholic, may be doubted. Chief plays: The Virgin Martyr, with Dekker (printed 1622); The Duke of Milan (1623); The Bondman (1624); The Renegado (1630); The Maid of Honour (1632); A New Way to Pay Old Debts (1633); The Roman Actor (1629); The Great Duke of Florence (1635); The Emperor of the East (1631); Believe as You List (1653); The Bashful Lover (1655); The City Madam (1658); Collected Works, ed. W. Gifford (1805, 1813), ed. H. Coleridge (1840), ed. F. Cunningham (1867); Sclections, ed. A. Symons (1887-9); Monograph by James Phelan (1878).

Massingham, Henry William (1830), English journalist, was born at Old Catton, near Norwich. He began his career on the Norfolk News and Daily Press, and was successively editor of the National Press Agency, the Labour World, the Stur, and the Daily Chronicle. As editor of the Chronicle, he warmly espoused the cause of the Greeks as against the Turks in 1897. He was also instrumental in exposing De Rougemont, who had successfully foisted himself upon the British Association as a traveller and explorer. On his retirement from the Chronicle Massingham became London editor of the Manchester Guardian, but relinquished the position in 1901 on his appointment as parliamentary descriptive writer for the Daily News.

Masson, DAVID (1822), Scottish man of letters, was born at Aberdeen. In 1852 he became professor of English literature in University College, London, and from 1858 to 1865 acted as editor of Macmillan's Magazine. In 1865 he was appointed professor of rhetoric in Edinburgh University, from which he retired in 1895. Professor Masson's chief work is his standard Life of Millon (6 vols. 1859-80). Among his other works are British Novelists and their Styles (1859), Recent British Philosophy (1865), Chatterton (1873), and Edinburgh Sketches and Memorics (1892).

Masson, George Joseph Gus-TAVE (1819-88), English educational writer was born in London, and from 1855 to 1888 was French master in Harrow School. He wrote Introduction to the History of French Literature (1860), Early Chronicles of Europe-France (1879), The Huguenots (1881), The Dawn of European Literature-French Literature (1888), and edited La Lyre Française (1867).

Massonia, a genus of small South African liliaceous plants which bear heads of comparatively insignificant, mostly white flowers.

Massorah, or Massoreth, the name (with various spellings) given to a body of annotations and signs accumulated by Jewish scholars (the Massoretes) for the purpose of keeping inviolate the text and interpretation of the Hebrew Old Testament. These commentators drew up rules for the guidance of copyists, made elaborate statistics of verses, words, and letters, noted peculiar forms and various readings, and so forth. The most valuable part of their work, however, was the invention of a system of punctuation (vowels and accents), which seems to have been gradually evolved in the 7th century. Two systems were developed -(1) the Tiberian, formed of arbitrary combinations of dots, dashes, and curves; and (2) the Babylonian or supralinear, in which the signs were modifications of the Hebrew letters, and written above the line. The former is in general use in printed books. The standard edition of the Massorah is Ginsburg's (4 vols. 1880-1906). See articles in Jewish Quarterly Review for 1889 and 1891.

Massowah, or Massaua, fort. seapt. on w. shore of Red Sea, Eritrea, partly on a coral islet. Ivory, skins, mother-of-pearl, gold, iron ore, coffee, to-bacco, wax, and ostrich feathers are among the exports £112,028 in 1903; imports, £306,426). There are important pearl fisheries in the Dalak archipelago, close by, and salt is evaporated. The heat is excessive: mean average temperature, 88°. Massowah was seized by Turkey in 1557, and in 1885 it was handed over to Italy. Pop. (1899) 7,775.

Master, one having direction or control over the actions of others. The word has various significations. As a specific title of office it is applied to the head or presiding officer of many societies or institutions—e.g. certain colleges, guilds, corporations, livery companies—and to certain officials—as master of the mint, master of the household, master of the horse. The heir-apparent to a Scottish peerage (now below the rank of an earl) is styled Master—e.g. Master of Polwarth—the specific designation being usually identical with the baronial title of the family.

Master and Servant. The relation of master and servant is created by contract. Their duties to and rights against each other arise out of contracts express or implied, except when their rights or duties are granted or imposed by statute. Servants may be classified thus: (1) Menial, including domestic servants; (2) workmen employed in non-domestic occupations. Amongst the latter those employed in certain trades (e.g. silk, cloth, coal, and iron) are subject to the provisions of special statutes. The duties of masters necessarily vary with the nature of the employment. They are regulated partly by usage, and partly by acts of Parliament affecting particular trades. principal duties of a master at common law are: (1) To pay his servant the wages or salary agreed upon (as to illegal deductions from wages, see the Truck Acts, 1831 to 1896); (2) to receive his servant into his employment and retain him in his service for the term agreed upon; (3) to indemnify the servant against all expenses and loss incurred in obeying his lawful orders; (4) to provide his (domestic) servants with wholesome and sufficient food and lodging, and for the neglect of this duty the master is liable on summary conviction to a fine of £20, or imprisonment for six months. (See the Conspiracy and Protection of Property Act, 1875, s. 6.) A servant must obey the lawful orders of his master, and be reasonably diligent and faithful in service. A servant may be dismissed for (1) wilful disobedience in important matters; (2) habitual neglect of his duties; (3) incompetence; (4) gross immorality, in case of domestic servants. When a servant is discharged for a valid reason before the expiration of the time for which he was engaged, he cannot recover the value of the services which he has rendered under the contract, but he is entitled to wages which have accrued and are unpaid. Thus, if the service be for a year, the year must be completed before the servant is entitled to be paid. Domestic servants may be discharged on a month's notice, or on payment of a month's wages in lieu thereof. A master is not bound to give a character, but if he gives one it must be a true one. Masters may recover damages against third persons who wrongfully deprive them of the services of their servants (see SEDUCTION) and a master is liable to third persons for his servant's wrongful acts done in the course of his employment. (As to a master's liability towards his servants, see EMPLOYERS' LIABILITY.) A servant has power to bind his master

by contract when he is specially authorized to do so, or when entering into contracts is necessarily incidental to the servant's position. The Conspiracy and Protection of Property Act, 1875, contains provisions as to trade disputes between men and masters, and also makes a breach of contract of service by persons employed in the supply of gas or water a criminal offence. Modes of arbitration in cases of trade disputes between workmen and employers are provided by the Acts of 5 Geo. 1V. c. 96; 30 and 31 Vict. c. 100; 35 and 36 Vict. c. 46; and by the Employers and Workmen Act of 1875. See also AP-PRENTICE.

Master of Arts. See DEGREE.
Masterton, tn., North Island
of New Zealand, 72 m. N.E. of
Wellington; has fish breeding
ponds. Pop. (1901) 3,949.

Mastic, a resin obtained from a shrub, Pistacia lentiscus, that grows in S. Europe. It is found in pale yellow, brittle tears that have a slight aromatic odour. It softens and melts when heated, and is used in the preparation of a varnish.



Mastiff.

Mastiff, THE, is one of the oldest varieties of British dogs. The Leghs of Lyme Hall in Cheshire keep a famous strain of mastiffs which date back to the 15th century, but they are quite different animals from those seen on the show-bench. To obtain a more massive appearance in the head, a cross of the bulldog was resorted to. The mastiff posresorted to. The mastiff possesses remarkable courage and power, and is by nature gentle and docile, though occasionally a savage specimen is met with. It has an acute sense of smell, and is gifted with considerable discrimination. But it is a cumber-some animal, of little use except as a watch-dog. Points:—Head large and massive; skull flatly rounded; ears small; muzzle square, deep, and broad; teeth level; eyes dark brown or hazelcoloured, and wide apart; front legs straight, with great bone; chest deep; loins strong and wide; colour brindled or fawn, but muzzle and ears must be black. The average height is 30 inches, and the weight 120

lbs.; but symmetry rather than size is the object aimed at. The Old English Mastiff Club and the Northern Old English Mastiff Club devote attention to the breed.

Mastodon, a fossil elephant of somewhat more primitive type than the mammoth. Its teeth have ridges (less numerous than in the elephant) which may be covered with conical tubercula-tions. There are several species of mastodon, and they range in time from the Miocene to the Pleistocene. In N. America its remains have been found in association with flint implements, but it has been extinct in Europe for a much longer period. Some species bear large tusks in both jaws; others only upper tusks.

Masûdi, ABUL HASSAN ALI (before 900-957), Arabian traveller, was born in Bagdad, and spent almost all his life in travel, visiting India, China, Madagascar, and other Eastern lands. His chief works are Meadows of (fold, a historical compilation (Fr. trans, by Barbier de Meynard, 1861-77), and Kitab ut-Tanbih, ed. by De Goeje (1894).

Masulipatam, tn., cap. of Kistna dist., Madras, India, 143 m. N. of Nellore. It was one of the earliest of the British settlements on the Coromandel coast. end formerly had a brisk export trade in cotton. Since 1841 it has been a centre of the Church Mis-sionary Society. The great storm which swept over the town in 1864 destroyed nearly 30,000 persons. Pop. (1900) 39,507.

Matabeleland, or MATABILI-LAND, dist., S.E. part of Rhodesia, British S. Africa, extending some 200 m. N. of the Limpopo R., by which it is separated from the

Transvaal Colony. See MATABILI. Matabili (Amandebili), a warlike Zulu people who, under the powerful induna (military chief) Umsilikatze, overran the greater part of the present Transvaal, and established themselves on the Bechuanaland frontier (1820-28). After their overthrow by the Boers in 1837 they withdrew across the Limpopo to the Matopo Hills, where Umsilikatze founded his chief kraal at Bulawayo. Lobengula, who succeeded his father Umsilikatze about 1870, was overthrown by the British South Africa Company's forces in 1893-4. Although claiming to be of pure Zulu stock, the Matabili are a very mixed people, consisting of three formerly distinct but now intermingled classes-Umsilikatze's full-blood Abasanzi Zulus; the Abemhla (Abentla), descendants of Bechuana captives; and the Maholi ('slaves'), a motley gathering of Mashonas and other broken tribes. Total population estimated in 1905

at 203,000. See W. H. Brown's On the South African Frontier: and Matabele-Mashonaland Mathondand and nauwove-land (1899); D. T. Laings The Matabele Rebellion (1896); F. C. Selous's Travel, etc., in S.E. Africa (1893), and Sunshine and Storm in Rhodesia (1896); S. J. du Toit's Rhodesia, Past and Present (1897); also MASHONALAND.

Matador. See Bull-Fighting. Matamoros. (1.) Or EL RE-FUGIO, tn., Tamaulipas, Mexico, on s. bk. of Rio Grande del Norte, 23 m. from its mouth, opposite Brownsville, Texas. The principal exports are specie, hides, wool, and horses. Pop. 13,000. See IZUCAR.

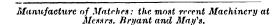
Matanzas. (I.) Province, Cuba, bounded on N. by Strait of Florida. Area, 3,700 sq. m. Towards the S. it is low and swampy; it produces sugar and tolacco. Pop. (1899) 202,462.
(2.) City and seapt. of Cuba, cap. of above prov., 50 m. E.S. E. of Havana. It has a capacious harbour, and exports sugar; and has rum-distilling, sugar-refining, and manufacture of guava jelly. Pop. (1902) 36,374.

Mataro, city, prov. Barcelona, Spain, 20 in. by rail N.E. of Bar-celona, on Mediterranean; manu-

factures laces, gauzes, and mus-lins. Pop. (1900) 19,704. Matches. The first lucifer matches, originated by Chancel in 1805, consisted of sticks tipped with a mixture of potassium chlorate and sugar, bound together by gum, and were fired by touching the tip upon concentrated sulphuric acid, which was carried separately in a bottle and soaked up in asbestos. These matches began to displace the tinder-box only about 1820, and they were the chief matches in vogue until the middle of the 19th century, when their place was taken by friction matches essentially similar to the ordinary matches of the present day. Flame is also obtained without the help of either friction or electricity in those self-lighting gas lamps now in use, in which, in presence of platinized asbestos, the burning of the coal gas with air takes place spontaneously—a principle that was discovered in 1823 by Döbereiner, and used by him in his platinum lamp. Modern his platinum lamp. Modern matches are tipped with an igniting composition containing essentially two chemical substances whose reaction with each other is accompanied by the evo-lution of heat. The substances are so chosen that the reaction starts of itself at a temperature that can be attained by rubbing the match head on a suitable surface. Thus a substance rich in oxygen, such as potassium chlorate, is mixed with another that readily unites with oxygen, such as phosphorus, so that on friction reaction readily takes place. As the combustion of the igniting composition is usually very sudden, it is found necessary, in order to ensure the ignition of wooden match splints, to coat a portion of the wood near the lead with some material that head with some material that will readily yield an inflammable

It is best cut into splints while still green; otherwise it must be steamed. One or other of two methods is mainly practised. In Sweden and in parts of Germany a continuous band or veneer as thick as a match is 'turned' off the rotating log by a steadily advancing knife, and cut lengthwise into ribbons as broad as a match

(0) INTO BUNDLES PRE VESTAS MARE IN SIMILAR MACHINE TO ROUND SPLINT MATCHES. TAPERS PASS THROUGH TURES IT AT A FIG.1, VESTAS LUT UPERS HINDER, INTRUST INTO HOLES.



vapour when heated. For this sulphur was formerly used (brimstone matches); but it is now almost entirely superseded in Britain by paraffin (wax) and stearine.

Manufacture.-The wood employed for splints must be very straight-grained, and is chiefly white Canadian pine and aspen.

is long, the splints being subsequently chopped off the ends of a layer of these ribbons by means of a guillotine knife. By the other method, mainly adopted in Britain, the timber, after trim-ming, is sawn into rectangular billets 41 in. long in the direction of the grain, which billets, by two slicings at right angles, are made to yield splints that are thus equal in length to two matches of 2% in. In 'frame dipmatches of Z_i in. In frame dip-ping, the splints, after drying, are filled by machine into rectangular 'dipping frames' (holding, say, 4,000), where they are clamped slightly apart from each other, and, if of double length, with one end projecting on each side of the frame. In the more recent method of 'coil dipping,' the splints are dropped continuously from a hopper at short regular intervals on to a running belt, each end of the splint projecting over the sides of the belt. The belt is wound into a coil, whipping in with it the splints, which, since the belt itself is as thick as a match, appear as a forest of stumps separated from one another by the proper distance. Whether in frame or in coil, the splints are then heated (to favour absorption) and dipped into the paraffin bath, first one end and

then the other.

As ingredients of the igniting paste the following may be present:-As oxidizing agents: potassium chlorate, nitre (especially in German matches), minium, manganese dioxide; as oxidizable bodies: white phosphorus, red phosphorus, gray sulphide of antimony, phosphorus sesquisulphide, thiosulphates or sulphocyanides of heavy metals; as binding material: glue or dex-trin; as bodies chemically inert, but added to increase friction or to retard the reaction: powdered glass, sand, and whiting; and as colouring matter: ultramarine or aniline dye. In ordinary British phosphorus matches the actual quantity of white phosphorus present is from 7 to 8 per cent., reckoned on the dry materials. For purposes of dipping, the paste is ladled to suitable depth into iron trays, kept warm by steam, a single immersion serving to produce the head of the match, after which the frames are placed in the drying-room. When the head is sufficiently hard, the splints are removed from the frames or coils, halved by a pivoted knife, and boxed. If white phosphorus is employed, the opera-tives exposed to its fumes are tives exposed to its jumes are liable to a special disease, be-ginning at carious teeth with necrosis of the jawbone ('phossy jaw'); and this, together with the poisonous and often too readily inflammable character of the pastes which contain this ingredient, has led to the manufac-ture or importation of common phosphorus matches being forbidden in certain countries—e.g. in Denmark and the Netherlands -and to the manufacture of the so-called 'safety matches,' either without phosphorus, or with the harmless red variety. The chemically active substances used for safety matches of the Swedish type are antimony sulphide with potassium chlorate on the match head, which, though it is ignited with difficulty by unaided friction, strikes easily on the special rubbing surface containing red

phosphorus.

In 1898 a prize of 50,000 francs was offered by the Belgian govern-ment for the best 'strike-any-where' match containing no white phosphorus, and this brought to light, inter alia, the virtues of the so-called 'sesquisulphide' of phosphorus. In France, where match-making is in the hands of the government, phosphorus sesquisulphide is now largely used, and a similar change has also taken place to a considerable extent in Great Britain. The sesquisulphide mixtures are not quite so satisfactory with restas, which demand a more inflammable igniting paste than wooden matches, as they must fire with slighter friction by reason of their more fragile stems. Fusees or resurians require several successive immersions in a paste containing charcoal and nitre to produce their large black pastille heads, with a final dipping into the ordinary igniting composition. Their stems, if wooden, are commonly Their treated with a fireproofing salt; a milder treatment of the same kind is sometimes given to the splints of common matches in order to lessen risk of fire from the smouldering of the unburned ends of discarded matches.

Matchlock. See FIREARMS.
Mate, an officer in a merchant vessel, whose duty it is to assist the captain. There are three grades—first, second, and third mates, the latter carried only by large sailing ships. The first (or chief) mate superintends all matters connected with the vessel, such as rigging and equipment, loading and unloading. He commands the port watch and keeps the log-book. The second mate commands the starboard watch, and takes charge of the ship when on his watch, or when the other officers are below. The third mate usually takes charge of the stores, and serves them out, helps in working the ship, and has to go aloft and work like an ordinary seaman.

Matchuala, th., San Luis Potosi, Mexico, 100 m. N. of the chief town. It is situated in the centre of a silver and lead mining district. Pop. (1900) 14,205.

Matera, tn. and archiepisc. see, Potenza prov., Italy, 34 m. w.N.w. of Taranto. The troglodyte caves of Monte Scaglioso still form the dwellings of some of the inhabitants. Leather is manufactured. Pop. (1901) 17.081.

Materialism, the philosophical theory according to which the only, or the only ultimate, reality is matter. The first distinctively materialistic system of ancient Greek philosophy was that of Democritus, who definitely sought to express the nature of the soul, and of psychical activities such as perception, in terms of his atomic theory. The soul consisted, according to him, of a finer kind of atoms, of which fire also is composed, and which are specially abundant in the human body. These atoms pass into and



Maté Tea. 1, Fruit ; 2, flower.

out of the body in respiration. Similarly perception is accounted for by means of atoms coming from the object to the senses. This teaching was adopted in its main features by the Epicurean school. In modern philosophy this cruder materialism could scarcely survive Descartes' dualism of extension and thought. Although the more extreme materialism was still represented in his contemporaries Gassendi, who revived the doctrines of Epicureanism, and Hobbes, who refused to admit any incorporeal existence, modern materialism has been of the less extreme but more plausible type which regards psychical life as a function of organized material bodies, rather than as itself any form or mode of material existence. The epi-thet 'materialistic' is, in fact, commonly applied to any mode of thought which exhibits a tendency to subordinate the higher elements of human life to the There have been two lower.

great outbursts of modern materialism: one in the 18th century, among the French Encyclopédistes; another in Germany in the 19th century, associated with the names of Moleschott, Büchner, and others. The chief work on the subject is F. A. Lange's History of Materialism (Eng. trans. 1877). See also Külpe's Introd. to Philosophy, s. 16 (Eng. trans. 1897).

Maté Tea, or Paraguay Tea, a beverage prepared from the Brazilian holly (Hex paraguayensis). The choicest quality consists of the unexpanded buds; the second of the full-grown leaf, with the exception of the woody fibre in the vascular system; and the third of the whole leaf roughly roasted. This tea has not the delicacy of flavour of, while it has more bitterness and astringency than, China tea; but it possesses an aromatic oil, gluten, tannin, and a proportion of theine. It is prepared as an infusion, flavoured with lemon juice and burnt sugar, and is commonly sucked through a reed or tube.

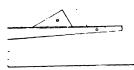
Mattre Ermengau (c. 1259-1322), Provençal writer, was born at Béziers; began to write his great encyclopedic work, the Brevieri d'Amor, in 1288, and finally entered the monastery of Béziers, where he died. The Brevieri was published in 2 vols. by Azaïs (1862, 1881).

Mathematical Instruments. a term including all instruments in use for drawing and measuring lines, areas, and angles. The straight-cdge and the compasses are alone indispensable for the construction of any figure in Euclidian geometry; but for ease in comparing lengths or in measuring off given lengths, a divided rule or scale is also indispensable. Moreover, in many problems of practical geometry, and especially in architectural, perspective, and mechanical instrument for drawing, an measuring off definite angles is absolutely necessary. (See Pro-TRACTOR.) Such an instrument is the protractor. It has various forms, but the most convenient is the semicircular or quadrantal. The rim is graduated in degrees or half-degrees, and the centre is indicated in such a way that it can be readily set at the point at which the angle is to be drawn. Parallel

Parallel Rulers.

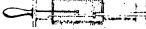
lines may be drawn by means of parallel rulers, in which two exactly similar straight-edges are linked together by two equal metal strips in such a way that in

all positions the edges and the lines joining the centres of the pins on which the strips pivot form a perfect parallelogram. When the one edge is kept steady, the other has a certain freedom of movement over the paper, but always so as to be parallel to itself. Another method for ruling parallel lines is to use a triangular disc in conjunction with a straight-The straight-edge is kept fixed, and the triangular disc is made to slide along it with one of the sides always in contact. To facilitate linear measure-ments, scales are divided in a great variety of ways. Gunter's scale is a scale divided acording to the logarithms of the natural numbers. This scale has de-



T-square and Set-square.

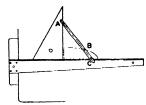
veloped within recent times into the slide rule, which is becoming more and more the rade mecum of the mechanic and engineer. Besides scales of the logarithms of numbers, scales have also been



Slide Rule, Fuller's Pattern.

graduated according to the sines and tangents of angles, or according to their logarithms. Many mechanical contrivances have from time to time been devised for drawing particular curves or for effecting particular subdivisions. Thus there are the elliptic compasses, constructed on the principle that an ellipse is described by any point on a line which moves so as to have two of its points moving along two fixed lines. Instruments have been constructed for trisecting and quinquesecting an angle-operations which cannot be performed with the use only of straight line and circle. For the measurement of areas, see PLANIMETER.

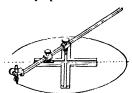
brief, intelligible, and comprehensive. Some idea of the modern scope of the subject may be



Method of drawing an Elliptical Curve.

On a strip of cardband set off an = half the major axis and nc = half the minor axis of the required ellipse. Insert a pencil at and drawing pins at a and c. The pencil will trace the curve as the pins slide against the edges of the squares.

gained by an enumeration of the great divisions into which mathematics is now divided. First comes the theory of numbers, which, beginning with ordinary arithmetical relationships, has gradually grown by extension into an important branch of algebraic analysis. Algebra, in the widest significance of the term, has long ago far transcended the generalized arithmetic in which it took its rise. The historic process is instructive. Concrete numbers were discarded in favour of symbols, and the processes of addition, subtrac-tion, multiplication, and division were themselves represented by special symbols linking together the symbols of quantity. This led to the recognition of forms of expressions, and the mathema-tician began to occupy himself with the properties of these ab-



Stanley's Elliptic Trammel.

stract forms. The fundamental symbols of operation, +, -, ×, +, acquired abroader significance; the development of the theory of algebraic functions led to the

Slide Rule.

Mathematics, in its simpler developments, may be defined as the science which deals by approved logical methods with the relations of magnitudes, quantities, and numbers. It is not possible to give a definition at once

introduction of the imaginary square root of negative unity, an impossible quantity arithmetically. The conception of the complex variable $a+b\sqrt{-1}$ as the generalized number of modern analysis marks an epoch as

important as the discovery of logarithms. Meanwhile, on the geometrical side of mathematics corresponding developments have taken place. The invention of Cartesian co-ordinates led not only to the description of properties of curves and surfaces by means of algebraic formulæ, but also to the geometrical interpretation of the properties of algebraic functions. This method has been particularly fruitful in the discussion of differential equations. A very important rôle in the general progress of mathematics has been played by the use of appropriate notations. The most familiar of these weapons of analysis is the determinant, the theory of which is one of the best illustrations of the way in which mathematical processes deal with forms and not with quantities or magnitudes. There is, however, another direction in which mathematical thought has been peculiarly active during the last fifty years -riz. the inquiry into the foundations of the subject. This has given rise to what is known as non-Euclidian geometry (see GEOMETRY), and has also icd to a careful scrutiny into the meaning of magnitude and number. Part of the difficulty encountered here may be appreciated by consideration of the difference between counting and measuring. In counting we use integral numbers, passing from the one to the other by a distinct transition. In measuring we seem to have in view a continuously varying quantity—such, for example, as time itself. Which of these concep-tions is the more fundamental? or can we pass logically from the one to the other? These questions are still matter of controversy. What, however, may be admitted is that demonstrations which are founded on the integral method are much the more rigorous. See articles on the special branches of mathematics. See also B. A. W. Russell's Foundations of A. W. Russell's retrievals of fecometry (1893), Principles of Mathematics (1903), and White-head's Universal Algebra (1898), for the latest views on the meaning and basis of mathematics.

Mather, INCREASE (1639-1723), American divine, was born at Dorchester, Massachusetts; became pastor (1664) of the North Church in Boston, and retained the charge to the end of his life. To it he added the presidency of Harvard College (1681). He was commissioned to present the colony's case to William III. after the revolution, and succeeded in obtaining a new charter for the colony. Unlike his son Cotton, he exercised, on the whole, a restraining influence during the New England witchcraft mad-

ness, while the son did everything in his power to fan the flames. COTTON MATHER (1663-1728) was elected colleague to his father in the North Church. His principal books are Memorable Providences relating to Witchcraft and Possessions (1685), and his account of the Salem witches in the Wonders of the Invisible World (1692). See E. Pond's The Mather Family (1844).

Matheson, GEORGE (1842-1906), Scottish divine, was born in Glasgow. Though he lost his sight early in life, in 1868 he became minister of Innellan, Argyllshire, and from 1886 to 1899 he had charge of the parish of St. Bernard's, Edinburgh. Among his works are Aids to the Study of German Theology (1874), Growth of the Spirit of Christianity (1877), Studies of the Portrait of Christ (1899 1900), The Representative Men of the Bible (1902-3), Laves for Quiet Hours (1904), and The Representative Men of the New Testament (1905).

Mathew, SIR JAMES CHARLES (1830), British judge, nephew of Bordeaux. He was called to the English bar in 1854; appeared as junior crown counsel in the Tichborne case (1873). He became a judge in 1881, and lord-justice of appeal in 1901. In 1892 he was appointed chairman of the Evicted Irish Tenants Commission, and in 1895 took charge of the Commercial Court.

Mathew, THEOBALD (1790-1853), Father Mathew, the Irish apostle of temperance, was born at Thomastown, Tipperary, and became a Capuchin friar. While labouring at Cork he began in 1838 a total abstinence association, which he conducted with such enthusiasm and success that he claimed to have administered the pledge to five millions of Irish people. The remarkable feature about his mission was the permanence of its effects in very many of those affected by it. His Life was written by J. F. Maguire (ed. 1882), and by F. J. Matthew (1890).

Mathews, CHARLES (1776-1835), English comedian, was born in London. He appeared at the Haymarket, London, in 1803, and from that date he constantly acted in London and elsewhere. He began in 1808 his famous 'At Homes,' which included recitations, songs, imitations, and ven-triloquism. These were very successful in England and America. His memoirs were edited by Mrs. Mathews (ed. 1862).

Mathiola, a genus of herbs and sub-shrubby plants belonging to the order Cruciferæ. The flowers are usually purple or white, and are for the most part fragrant. The genus includes garden stocks.

Mathura. See MUTTRA.

Matico (Artanthe elongata), a Peruvian shrub belonging to the order Piperaceæ. The leaves are aromatic, and possess certain

medical properties.

Matilda, or MAUD (1102-67),
empress, daughter of Henry I. of England, was twice married—first, in 1114, to the Emperor Henry v.; and secondly, in 1128, to Geoffrey Plantagenet, son of the Count of Anjou. On the death of Henry I., Stephen, her cousin, became king of England; civil war ensued (1139-47), and it was finally arranged that Ma-tilda's son, Henry 11., should succeed Stephen.

Matilda, CAROLINE. See CARO-

LINE MATILDA.

Matilda, Countess of Tus-CANY (1046-1115), daughter of Boniface, Duke of Tuscany, was born at Canossa, and succeeded her father when only eight years old. Her life was devoted to the championship of the church against antipope, nobles, and, above all, against the Emperor Henry IV.; and it was in her castle of Canossa that he submitted to Pope Gregory VII. She left her possessions to the see of Rome, and thus laid the foundation of the Pope's temporal power. See Matilda, Countess of Tuscany, by Mary E. Huddy (1905).

Matins, properly a morning service held before daylight, and therefore sometimes identical with nocturns. Anglican matins, or morning prayer, combines late forms of matins, lauds, and prime. Originally matins used to be said in the early morning before the communion service; but in the 18th century it became customary to say the office at eleven o'clock. The Rev. James Townley is credited with this innovation (Pullan's Hist. Prayer-book, p. 140).

Matlock Bath, wat.-pl., Derbyshire, England, 9 m. s.s.w. of Chesterfield, on the Derwent. Near it are Old Matlock, Mat-lock Bridge, and Matlock Bank, the last famous for its hydropathic establishments. Matlock and Matlock Bath now form separate urban districts. wards the end of the 17th century the waters of Matlock Bath began to be used medicinally. The warm springs (temp. 68° r.) are used in the treatment of rheumatic, cutaneous, and other There are famous affections. stalactite caverns and some petrifying wells. Pop. (1901)—Matlock, 5,980; Matlock Bath, 1,816.

Matsukata, Masayoski,

COUNT (1835), Japanese statesman, was born at Kagoshima; visited Europe in 1878, and studied finance. In 1881 he became finance minister in Japan, then on the verge of national bank-ruptcy. By his energy that disaster was averted, the issue of inconvertible notes stopped, national expenditure reduced, and the Bank of Japan established. In 1891-2, and again in 1896-7, he was premier of Japan. In 1897 a gold standard was adopted on his recommendation. In 1898-1900 he was finance minister, and in 1901 published Report on the Post-Bellum Financial Administration of Japan, 1896-1900.

Matsumai, or MATSUMAYE.

See FUKUYAMA.

Matsumoto, tn., Hondo, Japan, 140 m. N.W. of Tokyo; has an old Daimio castle. Silk, baskets, and bamboo boxes are made. Pop. (1898) 31,324.

Matsushima, vil., Bay of Sendai, E. coast of Hondo, Japan. Its shallow lagoon, studded with over eight hundred wooded islets, forms one of the 'three natural wonders' of the Japanese coast. Caves and grottoes are numerous.

Matsuyama, tn., w. coast of Shikoku, Japan, on the Inland Sea, 185 m. E.N.E. of Nagasaki, and 5 m. by rail from its scaport, Mitsu-ga-hama; has an ancient feudal castle. Pop. (1898) 36,545. Matsuye, tn., N. coast of

Hondo, Japan, on an inlet of the Sea of Japan, 130 m. w.n.w. of Kobé; manufactures paper. Pop. (1898) 34,651.

Matsys, or Massys, Quentin (1466-1530), Dutch painter, was born at Louvain, and is said to have been a blacksmith at first. Going to Antwerp in 1491. he became a member of the painters guild. He painted many religious pictures, portraits, and genre subjects, and his style may be regarded as intermediate be-tween that of Van Eyck and the realistic Dutch school. He died at Antwerp, where many of his best pictures are still shown. See Cohen's Studien zu Quinten Massys (1904).

Matte. See METALLURGY. Mattei, TITO (1841), Italian pianist and musical composer, was born at Campobasso. His first public performance was in 1846, and he gave concerts in England in 1853, and settled in London in 1863. He has published hundreds of songs and

pianoforte picces. Matter, in physics, is one of the indefinables of the universe. What we are directly conscious of in our experience are certain sensations which we believe correspond to certain material changes in the world outside of us. Not only, as we believe, is there change in the world external to us, but there is physiclogical change in the substance we call our brain. Behind these changes we postulate a permanent something whose essence remains unchanged, however much the relative configurations of its parts

may alter; and this something we call matter. The limitations of our senses should warn us against the assumption that matter has ultimately any real resemblance to what we conceive it to be. Indeed, many of the characteristics by which we recognize different kinds of matter do not, strictly speaking, belong to matter. Such, for example, is colour, which depends upon the nature of the illuminating light. Moreover, the progress of physical science has brought to our knowledge properties of matter which have no effect upon our organs of sense-e.g., electrical and magnetic properties. Had we an organ of perception sensitive to differences of electrical potential, our outlook on the world of phenomena would be fundamentally altered. These considerations show that all theories as to the ultimate constitution of matter cannot be other than purely speculative. There is, however, a general consensus as to certain ultimate characteristics of matter. There is first the permanency or conservation of matter, the principle which lies at the root of all chemical work and theory. At any rate, we are in possession of no method by which matter can be completely destroyed. Then there is the notion that the ultimate parts of matter are impenetrable: no two portions can occupy the same space at the same time. Kelvin has argued, however, that atoms may not be mutually impenetrable. Another general property is inertia. Finally, there is the universally accepted notion that matter is not a continuum, but that any finite recognizable portion of it is composed of small particles ultimately separate one from the other. This is sometimes expressed by the phrase 'the coarsegrainedness' of matter. In what the coarse-grainedness consists is entirely a question for specula-tion. Following Lucretius, we may imagine ultimate everlasting hard atoms; or we may, after Kelvin, regard the material atom as a whirl or vortex in a universally diffused continuum known as the ether; or we may adopt Larmor's modification, and think of the material atom as being a twist in a suitable medium; or, finally, we may find mental satisfaction in a speculation like that of Osborne Reynolds, who constructs an ether of a countless number of fine grains, and looks upon the gaps in this fine-grained structure as being the atoms of matter. According to this last speculation matter is ultimately not the real thing at all, but is the lack of the real essence. (See DILATANCY.) For convenience of reference, an important branch

of natural philosophy is called the properties of matter, including such subjects as colour, gravitation, clasticity, inertia, mass, and transparency. This classification, convenient though it be for didactic purposes, is essentially unscientific, and confuses what might be regarded as essential properties of matter and accidental properties. See also ELECTRON and RADIUM.

Matter, in philosophy, has two main usages. In the first and more general use, it is opposed to form; while in the second or more specific, matter is opposed to mind or spirit, the material world to the psychical or spirit-In Aristotle, from whom ual. the distinction of form and matter is derived, the usages are closely connected, since soul is regarded by him as the form or actualization of an organized body-the principle of life in virtue of which the body is a living body. The inferior position thus assigned to matter in the metaphysical analysis of Aristotle and his master Plato is connected in later Greek philosophy with the religious and ascetic doctrine which makes matter the source of evil. The most specific and technical use the distinction in modern philosophy is that made of it by Kant, in whose theory of knowledge form signifies the a priori or universal and necessary principles of cognition; matter, its empirical or sensuous elements. On the other hand, the distinction of matter and mind became, through Descartes's opposition of res extensa and res cogitans, a fundamental problem of modern philosophy. And not only did Descartes raise the more abstract philosophical problem of the relation of mind to the external world, but he is also entitled to be regarded as one of the principal founders of that mechanical view of the material world at which modern science has been steadily working since his time. On the scientific theories of matter, see Stallo's Concepts of Modern Physics (1882), in the International Science Series; or James Ward's Naturalism and Agnosticism (2nd ed. 1903), pt. i.

Matterhorn, or Mont Cervin, an Alpine summit (14,781 ft.), well known since the terrible accident which occurred on the occasion of its first ascent (July 14, 1865), when Lord F. Douglas, Rev. C. Hudson, and Mr. Hadow, with the guide Michel Croz, perished. This peak rises just south-west of Zermatt. Ropes, chains, ladders, and huts now render the ascent on either side comparatively easy. See Whymper's Scrumbles amongst the Alps (ed. 1893), and Th. Wundt's Das Mutterhorn (2nd ed. 1897).

Matthew, THE GOSPEL ACCORDING TO, the first book of the New Testament. Its place next to the Old Testament has been assigned to it by a just instinct, as it pre-eminently represents Jesus as the Messiah, the fulfiller of God's promises to Israel, and the descendant of David and Abraham. While it embraces a large part of the common synoptic tradition of the life of Christ, it is specially characterized by the amount of the life. ized by the amount of its discourse material, given in large sections. It has been commonly asserted that it was written for Jewish Christians; but a good case can be made out for the theory that it was designed as a handbook for the evangelists and teachers of the early church. This would explain the grouping of discourses -e.g. ch. 5-7, the sermon on the mount; ch. 8 9, miracles; ch. 13, parables. The tradition which connects the first gospel with the apostle Matthew also asserts that Matthew wrote in Hebrew. Thus, Papias (Euse-bius, Hist. Eccl., iii. 39) says: 'Matthew composed the logia in the Hebrew dialect, and each in-terpreted as he was able.' But of this collection of logia or 'sayings' (of Jesus) the present Matthew is certainly not a translation, as it shows incontrovertible evidence of being an original Greek work; and, in fact, so assured of this is modern criti-cism that many scholars regard the statement of Papias as an error. But at all events it points the way to a just understanding of the case. It is likely that Matthew had made himself master of a large body of our Lord's teaching, using it in his preaching, and gradually bringing it to a definite, if still oral, form; that this tradition, again, was in substance committed to writing (Greek) by a follower who stood in the same relation to the apostle as (according to Papias) did Mark to Peter; and that, finally, this discourse document was combined with Mark's history document (together with additional narrative matter-e.g. the birth story), the result being our present first gospel. The use of the name Matthew was so far justified, as it was the Matthæan element which gave the gospel its distinctive character among the synoptics. The date of composition is usually reckoned to be about 70 A.D. The Gospel of the Hebrews is believed to be a version or modification of Matthew at some stage of the latter's growth. See GOSPELS, and commentaries by Alford, Morison, Nösgen, Holtzmann (3rd ed. 1901), Weiss (ed. of Meyer), Bruce (Expos. Gr. Test.), Carr (Camb. Bible), Slater (Century Bible).



The Matterhorn.

Matthew, BASARAB (d. 1654), hospodar of Walachia, began to rule in 1633. In 1652 he established the first printing press in the principality, codified the law, and built numerous schools and churches. He also had the Scriptures translated into Walachian.

Matthew of Westminster, a Benedictine monk and historian who wrote a chronicle of Britain from the creation to 1307, which he entitled Flores Historianum (Eng. trans. 1853). Down to 1273 it is principally taken from Roger of Wendover. It has been argued that Matthew never existed, and that he is no other than Matthew of Paris.

Matthews, James Brander (1852), American critic and dramatist, was born at New Orleans. His works include The Theatres of Paris (1880), French Dramatists of the Nineteenth Century (1882), Pen and Ink (1888), Studies of the Stage (1894), Books and Playbooks (1895), Introduction to the Study of American Literature (1896), Aspects of Fiction (1896), A Confidant To-morrow (1900), The Philosophy of the Short Story (1901). He is editor of the Wampum Library of American Literature (1904, etc.). He has written several works of fiction, and is the author of two comedies (Margery's Lovers and The Decision of the Court), and part author of others (A Gold Mine, On Probation, and Peter Stuyvesant), that have been produced on the New York stage. In 1891 he was appointed professor of literature at Columbia University. He is president of the Simplified Spelling Board, whose first list of 300 new spellings was issued by President Roosevelt in August 1906.

Matthias Corvinus (1443-90), king of Hungary, the second son of John Hunyadi, was born at Klausenburg, and became king in 1458. He attacked the Emperor Frederick III., who had secured the Hungarian crown, and forced him to resign it (1463). He next attacked the Turks, and after invading Bosnia, made a truce with Mohammed II. in 1468. For the next ten years Matthias was troubled by a war with Bohemia and Poland, a rebellion in Hungary, and a fresh invasion of the Turks. He was victorious over the Poles, with whose king he made a treaty in 1475; he put down the rebellion in Hungary; and he checked the advance of From 1478 to his the Turks. death Matthias was in almost continual opposition to the Emperor Frederick III. In 1485 he occupied Vienna, and in 1487 invaded Lower Austria. He collected a large library at Buda, founded a university there, issued a law code, and effected many social reforms.

Matto Grosso, state, Brazil, lying N. of Paraguay. It forms part of the Brazilian plateau, and contains several ranges of mountains. In these are gold, silver, platinum, lead, and diamonds; but there is little mining. Medicinal plants abound. Coffee, sugar, and tobacco are grown. Cuyaba is the capital. Area, 532,670 sq. m. Pop. probably 100,000.

Mattoon, city, Coles co., Illinois, U.S.A., 175 m. s.w. of Chicago. Pop. (1900) 9,622.
Mau. (I.) Town, Jhansi dist.,
United Provinces, India, 117 m.

Mau. (1.) Town, Jhansi dist., United Provinces, India, 117 m. s.w. of Cawnpur; manufactures kharua cloth. Pop. (1901) 17,696. (2.) M. NATHBHANJAN, tn., Azamgarh dist., United Provinces, India, 55 m. N.E. of Benares, with manufactures of tussur cloth and silk.

Maubeuge, fort. tn., dep. Nord, France, on the Sambre, 14 m. s. of Mons; has an arsenal, and manufactures glass and hardware. Pop. (1901) 20.8%

and manufactures glass and hardware. Pop. (1901) 20,826.

Mauch Chunk, coal-mining centre, and cap. of Carbon co., Pennsylvania, U.S.A., on r. bk. of Lehigh R., 89 m. N.N.w. of Philadelphia. Its bracing air and magnificent mountain scenery attract many visitors. Pop. (1900) 4,029.

Mauchline, tn., Ayrshire, Scotland, 12 m. E.N.E. of Ayr, is chiefly associated with Burns, who resided at Mossgiel, ½ m. N., from 1784 to 1788. Agnes Gibson's ('Poosie Nansie's') cottage and Mauchline kirk are respectively associated with the Jolly Beggars and the Holy Fair. In the graveyard lie Nance Tinnock, Mary Morrison, and others who figure in the poet's works. Sycamore wood boxes and curling stones are made. Pop. (1901) 1.767. See Jolly's Burns at Mossgiet (1881).

Maude, Cyril (1862), English actor and manager, was born in London, but made his first appearance in America. He has played, chiefly in comedies, at many of the leading London theatres, and has been joint-manager of the Haymarket. He married Miss Winifred Emery. He published in 1903 The Haymarket Theatre.

Maudsley, Henry (1835), English physician and author, was born near Settle in Yorkshire. He has devoted much attention to mental diseases, having been superintendent of the Manchester Lunatic Asylum (1859-62), physician to West London Hospital (1864-74), and professor of medical jurisprudence in University College, London (1869-79). His most important books are Responsibility in Mental Disease (1872); Physiology of Mind (1876); Pathology of Mind (2nd ed. 1895); Natural Causes and Supernat-

ural Seemings (3rd ed. 1897); Life in Mind and Conduct (1903); and a work on Shakespeare (1905). He edited the Journal of Mental Science (1862-78).

Maul, isl., Hawaii, 31 m. N.w. of Hawaii. Area, 760 sq. m. It is divided by a low isthmus into two peninsulas. In the E. and larger part is the extinct volcano of Haleakala (10,215 ft.). Lahaina, on the w. coast, is the chief port. Pop. (1900) 25,416.

Maulmain, or MOULMEIN, seapt. and military cantonment, cap. of Amherst dist., Lower Burma, on l. bk. of Salwin. Martaban lies to the N., on the opposite bank of the river. The chief exports are timber, rice, cotton, horns, ivory, wax. lead, and copper. Shipbuilding is carried on. Pop. (1901) 58,446, very mixed.

Mauna Kea, extinct volcano in centre of Hawaii, the highest mountain in Polynesia (13,805ft.).

Mauna Loa, volcanic mt (13,650 ft.), Hawaii. It was in eruption in 1855, 1868, 1880, and 1887. On the E. slope is the vast crater of Kilauea.

Maunder, Samuel (1785-1849), English author, was born in Devonshire, and assisted his brotherin-law, William Pinnock, in the preparation of the once famous Pinnock's Catechisms. They also conducted a publishing business in London. Maunder compiled the Treasuries of Knowledge (1830), Biography (1838), History (1844), and Geography (1856).

Maundy, the name given to Thursday in Holy Week, to the sovereign's bounty, and to the small silver coins distributed on that day. The practice of washing the feet of twelve beggars on Maundy Thursday was last observed in England by James II. It is still followed by the Popand some Roman Catholic monarchs. In England, the king's maundy, formerly distributed by the lord high almoner in the Chapel Royal, Whitehall, is now given at Westminster Abbey, during a special service. It is called Maundy from the first word of the church's office for that day, Mandatan.

Maupassant, Guy de—his name in full was Henni Renk Albert Guy (1850-93)—French author, was born at the castle of Miromesnil, Seine-Inférieure. His style was formed by the teaching and influence of Flaubert; and he was one of the young men who wrote tales to be read in company at Zola's villa at Médan, which were afterwards republished as Soirées de Médan (1880). Of these Boule de Suif is by far the best, and it at once attracted attention. After Flaubert's mod-

erating and perhaps repressing influence was withdrawn (he died 1880). De Maupassant began publishing short nouvelles at a great rate. In 1892 he was suddenly seized with insanity, made an attempt upon his life, and died a lunatic at Auteuil. De Maupassant made a distinct art of the writing of the nouvelle, much as in the old Italian days the writing of the novella was a work of art standing by itself. The essential principle of De Maupassant's tale, be it tragic or comic, is that it shall spring out of, hinge or hang itself upon, some small, very definite, and concrete event or situation. He has the Frenchman's foible for letting his art, his technique, outstrip his in-spiration. His long novels, while they do not lack a knowledge of emotion, do lack strong characterization, and on that account are failures. His short stories are printed in such books as La Maison Tellier (1882), Mademoiselle Fifi (1882), Contes de la Bécasse (1883), Clair de Lune (1883), Les Sœurs Rondoli (1884), Miss Harriett (1884), Yvette (1885), Contes du Jour et de la Nuit (1885), La Petite Roque (1886), M. Parent (1886), Toine (1887), Le Horla (1887), Le Rosier de Mme. Husson (1888), and L'Inutile Beauté (1890). novels consist of Unc Vic (1883), Bel - Ami (1885), Mont - Oriol (1887), Pierre et Jean (1888), Fort comme la Mort (1889), and Notre Cœur (1890). All his works have been translated into English. See Lumbroso's Souvenirs sur Maupassant (1905).

Maupertuis, Pierre Louis Moreau de (1698-1759), French mathematician, was born at St. Malo; was one of the first in France to champion Newton's views, and in consequence he was elected a member of the Royal Society of London. He had be-come a member of the French Academy of Sciences in 1723. In 1736 he led the expedition to Lapland, to measure a degree of longitude, the results being described in La Figure de la Terre (1738). On the invitation of Frederick the Great he settled in Berlin, and was made president of the Academy of Sciences. A dispute with Voltaire dis-turbed his latter days. His Œuvres appeared at Lyons in See Damiron's Mémoires sur Maupertuis (1858); Le Sueur's Maupertuis et ses Correspondants (1897); and Briefwechsel Friedrichs des Grossen mit . . . Maupertuis, edited by Koser (1898).

Maurandya, a genus of Mexican herbaceous plants belonging to the order Scrophulariacea. They bear pretty bluish or rose-coloured flowers, the pedicles be-ing usually axillary. In Britain they require either greenhouse treatment or a warm situation against a wall in milder districts. They are propagated either by seeds sown in spring under glass, or by cuttings of young shoots taken in early autumn.

Maurel, Victor (1848), French

baritone singer, born at Mar-seilles. He appeared at the opera in Paris (1868), sang suc-cessfully at Milan, New York, St. Petersburg, Moscow, in 1879 at London, and in Hamlet, Aida, and Faust at Paris. Verdi permitted his Othello and Falstaff to be performed at Paris in 1885 solely on condition of Maurel's appear-

Maurepas, Jean Frédéric Phélippeaux, Comte de (1701-81), French statesman, born at Versailles; became minister of marine at the age of twenty-four, and in 1738 minister of state. He was exiled in 1749 on account of an epigram on Mme. de l'ompadour, but recalled in 1774, and inade chief minister by Louis XVI. His policy was anti-British: he helped the American colonists against the mother country. See Mémoires (4 vols. 1792).

Maurice, Prince of Orange and Count of Nassau (1567 1625), the youngest son of William the Silent, was born at Dillenburg. Soon after his father's assassination, in 1584, he was elected stadtholder by Holland and Zealand. In the war with Spain he showed conspicuous military talents, won many vic-tories (Turnhout and Nieuwe-poort), defended Ostend for nearly four years, and captured numerous towns and fortresses (Breda, Zutphen, Nimeguen, Groningen). In 1609 the Spaniards agreed to a truce of twelve years, and acknowledged the independence of the United Provinces. Maurice then apparently aimed at securing absolute power. In the religious disputes of the Arminians and Gomarists he supported the latter, and brought about (1619) the death of Olden van Barne-veld. In 1621 war with Spain was resumed.

Maurice, JOHN FREDERICK DENISON (1805-72), English divine, was born near Lowestoft. With Whitmore he was jointeditor of the Metropolitan Quarterly Magazine (1825), and edited the London Literary Chronicle before and after its amalgamation with the Atheneum. In 1834 he became curate of Bubbenhall, near Coventry. From 1836 to 1846 he was chaplain at Guy's Hospital, London, and for some time edited the Educational Mayazinc. In 1840 he was appointed professor of English literature and history at King's College, London, and professor of theology there in 1846; but in 1853 he

was dismissed from both chairs for his 'dangerous doctrines' the subject of eternal punishment. He helped to found Queen's College for female education, London (1848). He became the spiritual leader of the Christian Socialists, of whose paper, Politics for the People, he was joint-editor. He drew up a scheme for a working man's college, which was started in London in 1854, and of which he became principal. In 1866 he was appointed professor of moral philosophy at Cambridge—a post he held till his death, as he also did the incumbency of St. Ed-ward's, Cambridge, from 1871. He wrote Eustace Conway, a novel (1834); Subscription no Bondage (1835); The Kingdom of Bondage (1859); Inc Tragaca Christ (1838); What is Revelation? (1859); The Claims of the Bible and of Science (1863); and Moral and Metaphysical Philosophy and Metaphysical Philosophy (1871-2). See Life, edited by his son, F. Maurice (1884).

Maurists, a reformed Benedictine congregation, noted for their learning. They established themselves at St. Maur-sur-Loire in 1618, and later at St. Germaindes-Près, near Paris. In 1792 the

order was dissolved.

Mauritania, ancient name for a country in N. Africa, stretching E. from the Atlantic to Numidia. Under the Emperor Claudius, it became a Roman province. Later on it passed under the dominion of the Vandals and the Arabs.

Mauritia, a genus of large-growing palms, some of which are often grown as stove plants in Britain, a peaty loam and abundance of moisture being the principal desiderata. They bear large pendulous flower-spikes with

numerous catkins.

Mauritius, British island in Indian Ocean, 550 m. E. of Madagescar, formerly known as Isle of France. Its coasts are for the most part low, and surrounded by coral reefs. Area, 705 sq. m. The interior is a plateau, over-topped by Piton de la Rivière Noire (2.711 ft.) in the s., and Mt. Pieter Botte (2,677 ft.) in the N.W. The fauna formerly comprised large wingless birds, such as the dodo and the aphanapteryx, and tortoises of great size. The island is damp, and fierce cyclones occur, as in 1892. The chief products are wheat, maize, yams, manioc, but principally sugar. The exports—sugar, rum, molasses, cocoanut oil, aloe fibre, vanilla, salted fish, and hides—amounted in 1904 to £2,800,378, and the imports to £2,361,106. The only good harbour is Port St. Louis, on the N.W. coast. Secondary education is provided by the Royal College (Port Louis) and by Curepipe schools. The European population is mainly of French origin, and that language is commonly spoken. The capital is Port Louis. Mauritus is the scene of Bernardin St. Pierre's idyll of Paul et Virginie. It was discovered by the Portuguese in 1505, and remained in their possession till 1598; then it belonged to the Dutch until 1710. The French held it for exactly a hundred years, and in 1814 it was ceded to Britain. Hindus and Chinese are rapidly buying up the sugar estates. Pop. (1901) 378, 195, of whom 206, 131 are Hindus.

born at Valréas (Vaucluse); became a fashionable preacher at Paris; member of the Academy in 1785, and prior of Lions-sur-Santerre in 1786. As clerical representative for Lions to the States-general (1789) he distinguished himself as a champion of the rights of his order and of the nobility, being no unworthy rival of Mirabeau in oratory. He was made bishop of Nicaea (1791), and cardinal (1794). Napoleon made him (1810) archbishop of Paris. His Essai sur l'Eloquence de la Chaire (1810) is a valuable work.



Mauritius.

Maurocordatos, or MAVROCORDATO, ALEXANDER (1791-1865), Greek patriot, born at Constantinople of a Fanariot (Greek) family; became secretary to his uncle, Karaja, hospodar of Walachia, in 1817. He took an active part in securing Greek independence (1821-6), and successfully defended Missolonghi, where his friend Lord Byron died in his arms, and held Navarino and Sphacteria (1825). He was afterwards (1834 onwards) ambassador to London, Munich, and Paris, and was four times chief minister (1833, 1841, 1844, 1854-5).

Maury, Jean Siffrein (1746-

Maury, Jean Siffrein (1746-1817), French orator and prelate, His Œurres Choisies appeared in 1827. See Life by Ricard (1887), who also edited Maury's Correspondance et_Mémoires (1891).

Maury, Matthew Fontaine (1806-73), American hydrographer, was born near Fredericksburg, Virginia; published Navigation (1834); was appointed keeper of naval charts and instruments at Washington (1842). He instigated the taking of systematic observations at sea, published Atlantic Wind and Current Charts (1845), and Physical Geography of the Sea (1856). In 1868 he became professor at the Lexington Military College, Virginia. See Life by his daughter (1887).

Maurya, a dynasty which ruled over the kingdom of Magadha in N. India from the Hindu-Kush to the Bay of Bengal from 316 to 188 B.C. Founded by Chandragupta (Sandrocottus), this dynasty was continued by his son Bindusara, by the latter's son Asoka, and by Asoka's grandson Dasaratha.

Mausoleum, a sepulchral monument containing a receptacle for the dead, derives its name from a famous building, one of the seven wonders of the ancient world, erccted (353 B.C.) at Halicarnassus by Artemisia, in hon-our of her husband Mausolus, king (377-353 B.C.) of Caria, Asia Minor. On a basement 65 ft. high stood a quadrangular temple (heroon) of white marble with Ionic columns, topped by a pyramid bearing as its apex a quadriga containing heroic figures of Mausolus and his wife, the sculp-tured work being by Scopas and others. The total height was 140 ft. It was pillaged (1522) by the Knights of St. John to build the citadel of Budrum. Specimens (the Budrum Marbles) were sent to the British Museum by Sir Stratford Canning (1846) and by Newton (1857). (Sec Newton's Discoveries at Halicarnassus, 1862.) Other famous mausoleums are those of Augustus (28 B.C.), of Adrian (now the Castle of San Angelo), and of Cecilia Metella, on the Appian Way, at Rome; of the Bourbons at Dreux; of Queen Victoria and Prince Consort at Frogmore, near Windsor; of the House of Hanover at Herrenhausen, near Hanover; of Frederick William III. at Charlottenburg; of Napoleon III. at Farnborough, Hants; and many in the United States.

Mauve, or Perkin's Violet, the first aniline dye of commercial value that was prepared. It is obtained by the oxidation of crude aniline by bichrome and sulphuric acid.

Maverick, in America, cattle found straying, which may be branded and claimed by the finder. The name is derived from Samuel Maverick, a Texan, who appropriated a good many head found straying at the end of the civil war.

Mavis. See Song-Thrush and Thrush.

Maxentius, whose full name was Marcus Aurelius Valerius Maxentius, Roman emperor from 306 to 312 A.D. He was defeated by Constantine at Saxa Rubra, near Rome, and was drowned in the Tiber whilst trying to escape.

Maxillaria, a genus of tropical American terrestrial orchids, with slender coriaceous leaves, and mostly small flowers borne on one-flowered peduncles. They are easy of culture, liking a soil of sphagnum and fibrous peat.

They require a moderate summer temperature, and a winter temperature of from 50° to 55° F. Plenty of water should be given throughout the growing season, and a little through the winter. They are propagated by spring division of the pseudo-bulbs.

Maxim, SIR HIRAM STEVENS (1840), American inventor, was born in Maine. After 1877 he was prominently identified with the development of electricity, both as an illuminant and a motive power, in the United States. He settled in London in 1883, and invented the automatic machinegun which bears his name, also the 'pom-pom.' Maxim is also the inventor of a smokeless powder which closely resembles cordite, and of a method of manufacturing artillery from one solid piece of metal. He has devoted much attention to the problem of aerial flight and navigation, and has made successful trials with flying-machines of his own invention. He is still engaged in experiments in aeronautics. He was knighted in 1901.

Maxima and Minima. function f(x) is defined to be a maximum when x = a, if f(a) is algebraically greater than f(x), when x is nearly equal to a, but either greater or less than a: a minimum, if f(a) is algebraically less than f(x), when x is nearly equal to a, but either greater or less than a. f(a) denotes the value of f(x) when x = a. Maximum and minimum values as thus defined must not be confused with the greatest and least values that the function can take for any value of x; there may be several maxima and minima, and a maximum may be less than a minimum. Upon drawing a wavy curve and examining the height of the curve above a straight line in its place, it will readily be seen (1) that the crests are at a maximum height above the line, and the lowest points of the depressions at a minimum height: (2) that maxima and minima values occur alternately. The analytical conditions for maxima and minima may be obtained as follows. Suppose f(a) a maximum; then as x increases up to a, f(x) is increasing, and therefore its derivative f'(x) is positive: on the other hand, as x increases beyond a, f(x) is decreasing, and therefore its derivative f'(x) is negative. Hence if f(a) be a maximum, f'(x) will change from positive to negative as x increases through a. In the same way if f(a) be a minimum, f'(x) will change from negative to positive as x increases through a. If f'(x)is continuous, it can only change sign by passing through zero: hence those values of x for which f(x) is a maximum or a minimum

make f'(x) vanish. To distinguish whether the value of x obtained from f'(x) = 0 will make f(x) a maximum or a minimum, consider the second derivative. If f(a) is a maximum, then, as x increases through a, f(x) is passing from positive to negative -i.c. f(x) is decreasing. But if f(x) is decreasing, its derivative, which is f''(x), must be negative. Hence if f(a) is a maximum value of f(x), f'(a) will be zero, and f''(a) will be negative. For a minimum value f''(a) will be positive. If f''(a) is zero, the test fails; in that case we can examine whether f'(x)changes sign: if it does, f(a) is either a maximum or a minimum; if it does not, f(a) is neither a maximum nor a minimum. To illustrate this we may consider the problem of finding the cone of greatest volume which can be inscribed in a given sphere. Let R be the radius of the sphere, and x the distance from the centre of the sphere to the base of the cone. Then the volume of the cone is readily found to be $\frac{1}{3}\pi(R^3 + R^2x - Rx^2 - x^3)$. The first derivative of this function is $3\pi(\mathbf{R}^2 - 2\mathbf{R}x - 3x^2) = 3\pi(\mathbf{R} - 3x)$ (R + x), and is therefore zero when $x = \frac{1}{2}R$, or -R. The second derivative is $-\frac{1}{3}\pi(2\pi + 6x)$. When $x = \frac{1}{2}R$, this derivative is negative; when x = -R, it is positive. The volume is therefore a maximum when $x = \frac{1}{2}R - i.c.$ when the altitude of the cone is $\frac{1}{2}R$, and

this volume is $\frac{32\pi}{81}R^3$. The value x=- n makes the volume zero. See Chrystal's Algebra, vol. ii. For maxima and minima of func-

tions of more than one variable, see Gennochi-Peano's Differential und Inferential Rechnung (Ger.

trans. 1899).

Maximianus. (1.) MARCUS AURELIUS VALERIUS MAXIMIANUS, Roman emperor from 286 to 305 A.D., was a Pannonian by birth, and originally a private soldier, but was made by Diocletian his colleague in the empire. From 306 to 312 he was more or less associated with Constantine, but was put to death for plotting against him (312). (2.) GALERIUS VALERIUS MAXIMIANUS, usually known as Galerius, Roman emperor from 305 to 311 A.D. was a native of Dacia, originally a shepherd; fought in the wars of Aurelius and Probus, and in 292 A.D. was made Casar by Diocletian. He was merciless in his persecution of the Christians.

Maximilian I. (1459-1519), German emperor, was the son of Frederick III., and was born at Vienna. In 1477 he married Mary, the heiress of Burgundy, and in 1493 succeeded Frederick as emperor. Six years later the Swiss established their in-

dependence of the empire. Maximilian joined the League of Cambrai against Venice in 1508, and later the Holy League, but gained nothing by so doing. His fame is principally due to his efforts to reform the imperial and Austrian administrations. He established the public peace, he divided the empire for administrative purposes into ten circles, and he instituted the imperial chamber and the Aulic Council as supreme tribunals for the empire and Austria respectively. He was an accomplished knight, and was very popular with the citizen classes. See Seton - Watson's Maximilian I. (1901), and Lodge's Close of the Middle Ages.

Maximilian II. (1527-76), German against the distance of the Middle Ages.

Maximilian II. (1527-76), German emperor, the son of Ferdinand I., was born at Vienna, and succoeded to the throne in 1534. His reign was peaceful and uneventful, except that he kept the Turks in check in Hungary (1566-8). See *Life* by Holtzmann (1903).

Maximilian (1832-67), emperor of Mexico. was the younger brother of the Emperor Francis Joseph I. In 1857-9 he was governor of the Lombard Venetian kingdom. In 1863, under French influence, the Mexican clerical party offered to make him emperor of Mexico. Under the impression that he was summoned by the popular voice, Maximilian landed at Vera Cruz on May 29, 1864, but found himself opposed by a large proportion of the Mexicans headed by Juarez. Maximilian, gallantly refusing to desert his adherents, was betrayed to his enemies, and shot.

trayed to his enemies, and shot.

Maximinus, whose full name was Gaius Julius Verus, Roman emperor from 235 to 238 A.D., was the son of a Goth, and a shepherd. His enormous stature (more than eight feet) and strength attracted the attention of Septimius Severus, who made him one of his own guards. Finally he secured his own election to the imperial throne, and carried on a successful campaign against the Germans. But his home government was brutal and rapacious, and he was killed by his own troops at Aquileia.

his own troops at Aquileia.

Maximus, a family of the Fabian clan at Rome. See Fabia Gens.

Maximus, Magnus Clemens, Roman emperor from 383 to 388 A.D., was a Spaniard by birth, and an officer of Theodosius the Great, whom he accompanied to Britain in 368; he was proclaimed emperor by the troops there. In 387 he invaded Italy, and expelled Valentinian II.; but Theodosius soon arrived, defeated Maximus, and, having captured him at Aquileia, beheaded him.

Maximus, l'ETRONIUS, Roman emperor for less than three months in 455 A.D. A high official of Roman birth, he slew Valentinian III. and ascended the throne, but was killed in the Vandal capture of Rome.

Maximus, Tyrannus, Roman emperor from 408 to 411 A.D., was only the tool of Gerontius, after whose defeat at Arles in 411 he was deposed by Constantine. He was executed in 422 for raising a revolt in Spain.

for raising a revolt in Spain.

Maximus, VALERIUS. See
VALERIUS.



Friedrich Max-Müller.
(Photo by Elliott and Fry.)

Max-Müller, FRIEDRICH (1823-1900), Orientalist and philologist, was born at Dessau in Germany, and was the son of the poet Wil-helm Müller. His first book was a translation into German of the Hitopadcsa (1844). In 1847 he was commissioned by the East India Company to edit the Rig-Veila: it was published at Oxford (1849-74; new ed. 1890), where Max-Müller was appointed (1850) deputy Taylorian professor, and in 1854 Taylorian professor. In 1868 the new chair of comparative philology was created for him, and he held it until 1875. In 1878 he delivered the first Hibbert lec-ture on The Origin and Growth of Religion,' and he was Gifford lecturer in natural religion at Glasgow University (1889-93). Among his other principal works are Comparative Mythology (1856), History of Ancient Sanskrit Literature (1859), Lectures on the Science of Language (1861-3), Introduction to the Science of Religion (1873), Biographical Essays (1884), Auld Lang Sync (1899), My Autobiography (1901), and Last Essays (1901); besides numerous editions of Sanskrit texts, including the very important series The Sacred Books of the East (1875 onwards). See Life and Letters of Max-Müller, by his wife (1903).

Max O'Rell, the pen-name of PAUL BLOUET (1848-1903), French man of letters, was born in Brittany. In 1876 he was appointed teacher of French at St. Paul's School, London. In 1883 he published a witty and caustic book, John Bull et son Ile, in both French and English. Other books in the same vein, dealing with Scotland, America, and France, followed. After 1890 he lectured with success in the United Kingdom, the colonies, and the United States. Latterly he acted as correspondent for the New York Journal in Paris.

Maxwell, SIR HERBERT EUS-TACE (1845), Scottish man of letters and politician, was born at Edinburgh, and represented Wigtownshire in the House of Commons from 1880-1906. When Lord Salisbury formed his second administration in 1886, Sir Herbert was made a lord of the Treasury and this position he filled till 1892. He had previously pre-sided as chairman of the Select Committee on Provident Insurance (1885-7), and subsequently served as a member of the Royal Committee on Aged Poor (1893-4), and as chairman of the Royal Commission on Tuberculosis (1896-7). He is a versatile writer: his chief books are Meridiana-Noontide Essays (1892), Post-Meridiana - Afternoon Es-Post-Meridiana — Afternoon Essays (1895), Rainy Days in a Library (1896), Memories of the Months (1897, 1900, and 1903), Studies in the Topography of Galloway (1887), A History of Diunfriesshire and Galloway Galloway (1881), A History of Dumfriesshire and Galloway (1896), The Life and Times of Mr. W. H. Smith (1893), Robert the Bruce (1897), Sixty Years a Queen (1897), Life of the Duke of Wellington (1899), Salmon and Sea Trout (1898), The House of Douglas (1901), George Romney (1902), British Freshvater Fishes (1901), and The Story of the Tweed (1905).

Maxwell, James Clerk (1831-79), Scottish physicist, was born in Edinburgh, and communicated a paper on 'Ovals' to the Edin-burgh Royal Society when barely fifteen. He graduated as second wrangler at Cambridge in 1854, and was bracketed Smith's prizeman, and won the Adams prize in 1857 for 'An Investigation of Saturn's Rings,' In 1856 he was appointed professor of natural philosophy in Marischal College, Aberdeen, holding the post till the chair ceased to exist (1860): in that year he received the Rumford medal of the Royal Society, and became professor of natural philosophy in King's College, London. This post he resigned London. This post he resigned in 1865, and retired to Glenlair in Kirkeudbrightshire, till called to the professorship of physics in Cambridge in 1871. It may be

doubted whether any one has done more for the advancement of modern physics than Maxwell; for not only did he possess great powers of manipulation, and of attacking questions physically, but he also had the ability to analyze and extend them mathematically, with an offectiveness that has been rarely equalled. His principal researches were into the composition and vision of colour, the kinetic theory of gases, and electricity, in which, by a theory of molecular vortices, he connected the phenomena of elecand magnetism, tricity proved the oneness of the disturbances of the ether caused electrically and by light—a deduction that has since been practically demonstrated by the experiments of Hertz and others. Besides his Scientific Papers (collected in 8 vols. in 1890), he wrote text-books on Matter and Motion (1873), Heat (1870), and Electricity and Magnetism (1873), numerous articles for the Encyclopædia Britannica, and also edited the Electrical Researches of Cavendish (1879). See Life (1882) by Campbell and Garnett, and James Clerk Maxwell and Modern Physics (1896), by Glazebrook.

Maxwell, Mrs. John. See Braddon.

Maxwell, Sir John. See Herries, Lord.

Maxwell, Sir William Stirling (1818-78), Scottish art historian and critic, was born at Kenmure, near Glasgow, and was chairman of the Scottish Education Board. Among his works are Annals of the Artists of Spain (1848), Cloister Life of Charles v. (1852), Velasquez and his Works (1855), and two other books relating to Charles v.

Maxwelltown, tn., Kirkeudbrightshire, Scotland, on r. bk. of Nith, and opposite Dumfries. It has tweed and hosiery mills. On Corbelly Hill is the fine convent and church of the Immaculate Conception. Pop. (1901) 5,796.

May. See YEAR, and HAW-

May, ISLE OF, isl., Fifeshire, Scotland, at mouth of the Firth of Forth, 5 m. s.s.e. of Crail. The island (1641 ac.) is generally flat, but on the w. rises to 160 ft., at which point there is a lighthouse (visible 21 nautical miles). On the May are the ruins of St. Adrian's priory (a 13th-century structure), and the miraculous holy well, to which pilgrims formerly resorted.

May, Phil (1864-1903), Eng.

May, PHIL (1864-1903), English caricaturist, was born at Leeds. His earliest drawings were contributed to the St. Stephen's Review. Three years were spont in Australia, where he



May Day in the Olden Time—'Raising the Maypole.' By F. Goodall, A.R.A. (From the larye engraving, by permission of the 1rt Union of London.)

Mayhew

worked on the Sydney Bulletina series of caricatures, 'Things we see when we are out without our Gun,' attracting a good deal of attention. After his return to London, about 1890, he came to be recognized as one of the most considerable masters of 'line' drawing, and his contributions, principally of London types-the coster, the East End girl, the gutter-snipe, and so on-hegan to appear in illustrated periodicals. A few years before his death he became a member of the permanent staff of Punch. Phil May's Annuals were illustrated throughout with his own drawings, in which the presentation of character was in complete harmony

with the jest or with the pathos.

May, SIR THOMAS ERSKINE,
FIRST BARON FARNBOROUGH (1815-86), was born in London, and became in 1831 assistant librarian to the House of Commons. From 1847 to 1856 he was examiner of petitions for private bills, and taxing-master to both houses, and president of the Statute Law Revision Committee (1866 84). He published A Treatise on the Law Privileges, Proccedings, and Usage of Parlia-ment (1844), still accepted as an authority; Constitutional History of England, 1760-1860 (1861-63; revised ed. 1871); and Democ-

63; revised ed. 18(1); and Democracy in Europe (2 vols. 1877).

Maya, in the Vedanta philosophy, 'illusion' or 'deception' (otherwise called Avidya, 'ignorance,' or Sakti, 'female energy'), the fictitious energy which, in conjunction with the supreme self (Brahman), produces the cosmic soul (Isvara). Maya is personified as a female form of celestial origin, created to beguile. She is sometimes identified with Durga as the source of spells, or as a personification of the unreality of worldly things.

Mayaguez, tn., Porto Rico, W. Indies, 72 m. s.w. of San Juan; exports sugar, coffee, oranges, pine-apples, and cocoanuts. Pop. (1899) 15,187.

Maya-Quiché, a main division of the Central American aborigines, and in some respects the most civilized people of the New World. They ranged along the eastern slope of the Mexican tableland into Yucatan, Guatemala, and Honduras. There are three distinct ethnical groups:—(1.) The Huaxtecs and Totonacs of Tamaulipas, S. Luis Potosi, Puebla, and Vera Cruz. (2.) The Mayas, Lacandons, Itzas, Petens, and Chaniabals of Yucatan, Tabasco, Chiapas, and North Guatemala. (3.) The Quiches, Mames, Cachiquels, Sutughils, Chols, Pocomans, Zendals, Zotzils, Poconchis, and others of South Guatemala, San Salvador, and North Honduras. See AZTECS; cf. also MAYAS.

Mayas, chief branch of the Maya-Quiche family; still constitute the bulk of the inhabitants of Yucatan, where their ancient language is still spoken by about 1,700,000 people. The Mayas were distinguished for their architectural genius, astronomic lore, and picture writings. This calculiform ('pebble-shaped') script, although still undeciphered, is known to contain several true phonetic characters, and thus approaches nearer even than the Aztec to a syllabic or alphabetic system. The whole of Yucatan and neighbouring districts are strewn with the monumental ruins of ancient Maya cities, amongst which Palenque, Uxmal, Copan, Coban, Quirigua, and Chichen-Itza are conspicuous for the vast size, fine proportions, and elaborate carvings of their palaces, monoliths, and temple-crowned pyramids. Their calendric system also reveals a surprising knowledge of astronomy, the year being divided into 18 months (or weeks) of 20 days each. with 5 epacts and recurrent lesser and greater cycles, calculated for 4, 52, and apparently 104 years, and dating back for many centuries, some even think for thousands of years before the discovery. See D. Charnay's Ancient Cities of the New World (1887); A. P. Mandslay's Biologia Centrali-Americana (in progress); M. F. Squier's Travels in Central America (1853); J. L. Stevens's Incidents of Travel in Yucatan (2 vols. 1858).

Mayavaram, tn., Tanjore dist., Madras, India, on Cauvery R., 28 m. N.W. of Negapatam. It is celebrated for its fine cotton cloth, known as kornad. Pop. (1901) 24,276.

Maybrick, Mrs. (née Florence CHANDLER), married James Maybrick, a cotton broker and native of Liverpool, in 1881. In 1889 she was found guilty of having poisoned her husband with arsenic, and condemned to death. The sentence was later commuted to penal servitude. She was released in 1904.

May Day, the first day of May, has everywhere been an important period in the religion of nature - worship. Formerly, the Isle of Man, two maidens were selected, one to represent the Queen of May, and the other the Queen of Winter, each with a following of young men who engaged in a mock battle, thus symbolizing the last efforts of winter to maintain its sway. At the present time, in Servia, Roumania, and Bulgaria, it is customary for groups of gypsy children to wreathe their heads and waists with leafy twigs, and, led by older girls or by women, to go from house to house, dancing

and singing. Among the Transylvanian and also the Roumanian gypsies the spirit of vegetation is often represented by a boy, who is called Green George. A simi-lar custom is followed by the peasants of Rhenish Bavaria and of Ain (France). The chimney-sweepers of England were long associated with this ceremony, one of their number being chosen as 'Jack-in-the-green,' or 'the Bush-carrier.' Dr. J. G. Frazer, who describes this ceremony, adds that it was celebrated at Cheltenham as recently as 1892. In some places it is the custom to carry a doll decked with leaves. known as the May doll, or else a branch known as the May bough, bush, or tree, instead of personally enacting spring. The festival of dancing round a tree, or maypole, on the 1st of May, is another manifestation of the same idea. The maypole dances fell into desuetude at a much earlier date in Scotland than in England.

Mayer, Julius Robert von (1814-78), German physicist, born at Heilbronn; is to be credited with determining the relation of mechanical work to heat ('the mechanical equivalent of heat') in calculating the quantity of heat produced by the compression of gas. He was also one of the first to state the principle of 'the conservation of energy.' His papers were published as Mechanik der Warme (1867; 2nd ed. 1874). See Life, in German, by Dühring (1895–1904), and by

Friedländer (1905).

Mayflower, VOYAGE OF THE. See PILGRIM FATHERS.

The old Mayhem (= maim). offence consisted in depriving a man of a member useful in fight. either for offence or defence. Now by the Offences against the Person Act, 1861, maining or intent to maim is punishable with penal servitude for life.

Mayhew, Augustus Septimus (1826-75), English author; in conjunction with his brother Henry he produced many volumes of popular fiction (see next art.). His best individual works are Pared with Gold (1857) and Faces for Fortunes (1865). He wrote plays in collaboration with H. S. Ed-

wards.

Mayhew, HENRY (1812-87), English author. With Gilbert & Beckett, he founded Figaro in London (1831-9) and The Thief (1832). His first play, The Wandering Minstrel, containing the popular song, Villikins and his Dinah, appeared in 1834. He was an originator and joint-editor of Punch (1841); wrote London Labour and London Poor (1851), The Criminal Prisons of London (1862), The Bouhood of Martin Luther (1865), The Rhine (1856); and, in conjunction with his

brother Augustus, several popular novels—The Good Genius and The Greatest Plaque of Life (1847), The Image of his Father and Whom to Marry (1848), and The Magic of Kinthess (1849).

Maybole, th. and bur., Ayrshire, Scotland, 9 m. by rail s.w. of Ayr. Shoemaking is the principal industry. The main features of interest are the collegiste church (1371), 'John Knox's house' (where he debated with the abbot of Crossraguel), and a town hall (1887). Par. (1901) 5 802

hall (1887). Pop. (1901) 5,892.

Mayen, th., Rhine prov., Prussia, 15 m. w. of Koblenz; has a fine Gothic church and a mediaval castle. Cloth, oil, leather, and yarn are manufactured; and

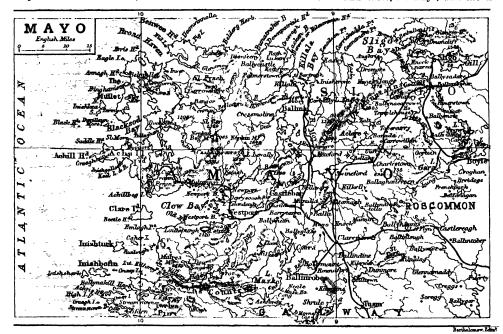
of above dep., France, on river Mayenne, 18 m. N.E. of Laval. 1ts castle, now in ruins, was taken by the English in 1424. Calico and linen are manufactured. Pop. (1901) 10,125.

May-fly. See EPHEMERA.
Maynard, SIR JOHN (1602-90),
English statesman and judge,
represented Totnes in the Short
and Long Parliaments. He was
imprisoned for opposing parliamentary measures; became protector's serjeant (1658), solicitor-general and king's serjeant
(1660), and lord commissioner of
the great seal (1689).

Mayne, JASPER (1604-72), English dramatist and divine, was a native of Devonshire. He was

that year the college was built to the design of Pugin. On the passing of the Irish Church Act of 1869, the annual endowment was compounded for a sum equal to fourteen times the amount. A new chapel was built in 1890. In 1878 a destructive fire devastated a great part of the college, but this has been restored. The students number about 600.

Mayo, maritime co., prov. Connaught, Ireland. The N.W. is much indented—Killala Bay, Broad Haven, and Blacksod Bay separating the Mullet peninsula from the mainland; Achill Sound, between Achill I. and the mainland; Clew Bay, with Newport and Westport Bays, and the is-



there are tanneries, flour mills, and tobacco factories. Pop. (1900) 11.961.

Mayence. See MAINZ.

Mayenne. (1.) Department,
N.W. France; comprises nearly
the whole of the basin of the
river of that name, a r. bk. tributary of the Loire, the stream
being known in its lower course
as the Maine. The department
once formed part of the provinces of Maine and Anjou. It is,
on the whole, flat. Agriculture
is the principal industry, and
beetroot and cider-apples are
raised. There are granite and
slate quarries, and the manufactures comprise cotton-spinning
and linen. Area, 1,986 sq. m.
Pop. (1901) 313,103. (2.) Capital

the author of two plays, The City Match (1639), and The Amorous War (1648), the former of which held the stage for many years. He also published a translation of Lucian's Dialogues (1664), and several sermons and pieces of verse. He rose to be canon of Christ Church, Oxford; and after the restoration he was appointed chaplain to the king.

Maynooth College, Co. Kildare, Ireland, was established by the Irish Parliament in 1795 to provide education for the Roman Catholic clergy, a sum of about £9,000 being annually voted to it. In 1846 there was granted an annual permanent endowment of £25,000, and at the same time a building grant of £30,000. In

lands of Clare and Inishturk; and Killary Harbour. The surface is flat or undulating in E., mountainous in w. and centre (Muilrea, 2,680 ft.; Croagh Patrick, Nephin); in the N.E. are the Ox Mts. Lough Conn is wholly and Lough Mask partly in this county. The chief rivers are Moy and Owenmore. The fisheries (including salmon) are important. The county returns 4 members to Parliament. Area, 2,156 sq. m. Pop. (1901) 199,166.

Mayo, RICHARD SOUTHWELL BOURKE, EARL OF (1822-72), British statesman, born at Dublin. He entered Parliament in 1847; was chief secretary for Ireland in 1852, 1858, and 1866; and was appointed viceroy of India (1868), He helped to preserve the autonomy of Afghanistan, and introduced fiscal reforms into the administration of India. He was assassinated by a convict at l'ort Blair, Andaman Is.

Mayon. See ALBAY.

Mayor, the chief magistrate of a city, borough, or municipal corporation. In England the mayor is elected annually by the councillors and aldermen, and presides over the meetings of the town council. (For the corresponding office in Scotland, see Provost.) The chief magistrates of London, York, Liverpool, Manchester, Birningham, Bristol, Leeds, Sheffield, Dublin, and Belfast are Lord Mayors. In France the maire is the head official of a town, commune, or district. In the western United States many villages are incorporated existing each with a mayor.

rated as cities, each with a mayor.

Mayor's Court, a customary court of record of the city of London. It is held at the Guildhall before the recorder or the assistant judge, and has both common law and equitable jurisdiction. Its procedure is now regulated by statute, and appeals which formerly lay to the ancient court of St. Martin's-le-Grand, long since abolished, now lie in some cases to the Court of Appeal, and in others to a divisional court. The most interesting feature of the court's jurisdiction is the process of 'foreign attachment.'

cess of 'foreign attachment.'

Mayotte. See COMORO Is.

Mayow, JOHN (1643-79), English chemist, was born in London.

He discovered that the atmosphere consists of two gases, one of which is the same as that obtained from saltpetre, and is also intimately concerned with combustion. He had also sound views as to the respiration of animals.

Maysville, city, Kentucky, U.S.A., co. seat of Mason co., on the Ohio, 60 m. N.E. of Lexing-

ton. Pop. (1900) 6,423.

Mayweed, a name sometimes given to the stinking channomile (Anthemis cotula), an annual composite plant common in waste places throughout Britain. It has erect branched stems and large solitary heads of flowers, with a disagreeable odour.

Mazagan, scapt., w. coast of Morocco, 125 m. N.w. of Morocco, of which it is the port. It has an open roadstead, with a tolerably safe anchorage. In 1904 the exports were £333,554, and the imports £403,656. The exports are chiefly cereals (beans), wool, with add fruit Box 10,000

gum, and fruit. Pop. 10,000.

Mazamet, tn., dep. Tarn,
France, 50 m. S.E. of Toulouse;
is one of the strongholds of Protestantism in Languedoc. The
chief industries are tanning, woolspinning, dyeing, and mining.
Pop. (1901) 13,978.

Mazanderan, prov., N. Persia, between the Caspian Sea and the Elburz Mts. It is in many parts swampy, and the climate unhealthy. Silk, caviare, and agricultural produce are exported. Iron ore and petroleum are found. Area, 10,460 sq. m. Pop. 390,000.

Mazarin, whose real name was Guillo Mazzarini (1602-61), French minister of state, was born at Pescina, in the Italian Abruzzi. He showed great ability in the negotiations leading to the peace of Monzon in 1626, and again during the negotiations which ended in the treaty of Cherasco (1631). The Pope made him legate at Avignon, and in 1634 he was sent to Paris as nuncio-extraordinary. In 1639 he became a naturalized French subject, and his skill as ambassador to Savoy led Richelieu to demand for him a cardinal's hat. On the death (1643) of Louis XIII. Mazarin was appointed by Anne of Austria first minister of the crown. Having crushed the fac-tion of the imperialists headed by the Duc de Beaufort, Mazarin resisted all attempts to weaken the central power by the re-establishment of semi-feudal provincial governments. He thus, with infinite patience, sagacity. and firmness, continued the policy of Richelieu at home and abroad. His efforts, backed by the successes of the French arms, helped to bring about the peace of Westphalia (1648); and after that France stood forth as the leading power in Europe. Paris, how-ever, resented the firm rule of Mazarin, and in 1648 the movement known as the First or Parliamentary Fronde broke out. This movement was headed by the Parliament of Paris, a close corporation of lawyers, who aspired to take the place of the States-general. As the queenregent and Mazarin resisted all attempts to lessen the royal power, civil war broke out (1649). Later in the same year the Second or New Fronde broke out. This movement, headed by Condé, lasted till 1653. But whereas the First Fronde desired to set up the government of an official aristocracy, the Second Fronde aimed at the supremacy of the nobles. For a time Mazarin had to bow before the storm, and retired to Brühl, near Cologne, for Turanna had joined the for Turenne had joined the Spaniards, then invading France; and though the royalists won the battle of Réthel (1650), the two Fronde parties united, and Bordeaux became the centre of a widespread provincial rebellion.

On Sept. 7, 1651, Louis XIV. attained his majority, and in December Mazarin returned. Tu-

renne joined the royal cause, and Condé, the leader of the nobles, became a rebel. Then ensued an exciting period, during which Paris repulsed the king at the battle of the Faubourg Saint-Antoine (July 2, 1652), and Maz-arin again went into exile (Aug. 19, 1652). But the tide had in reality turned. On Oct. 13, 1652, Condé fled from Paris. The Parliament's political powers were overthrown, Mazarin was finally recalled (February 1653), and gradually the Fronde movement was crushed in the provinces. Henceforward, till his death, Mazarin was the undisputed head of the government. His work was twofold-first, to restore order and to reorganize the finances; secondly, to end the war with Spain. In his foreign policy he found the English alliance invaluable, and the death of the Emperor Ferdinand III. in 1658 most opportune. On March 23, 1657, an alliance between England and France was signed. With the aid of a strong English contingent, Turenne over-threw Condé and the Spaniards on June 14, 1658. In the battle of the Dunes, Dunkirk was taken and given to England. This led eventually to the treaty of the Pyrenees (Nov. 7, 1659).

Mazarin was a famous collector of books and of art treasures, and during his lifetime amassed a large fortune, most of which he bequeathed to the king. He was one of the founders of that centralization and of that cleavage between classes which led to the French revolution. See Ch6ruel and D'Avenel's edition of Lettres du Cardinal Mazarin (1879-95), Ch6ruel's Histoire de France sons le Ministère de Mazarin (1883), and Hassall's Mazarin (1903).

Mazar-i-Sherif, tn., N. Afghanistan, 11 m. s.e. of Balkh. Swords and other weapons are manufactured. Pilgrims visit the tomb of the prophet Ali here. Pop. (estimated) 25,000.

Mazarron, city, prov. Murcia, Spain, port on Mediterranean, 18½ m. W. from Cartagena. Iron, silver, and lead are exported. The town has soap factories, flour mills, and iron and lead mines. Pop. (1900) 23,284.

Mazatlán, chief scapt. of Mexico, on Pacific coast, in the mining state of Sinaloa, and in a coffee, cotton, and sugar district.

Pop. 16,000.

Mazeppa, IVAN STEPHAN-OVITCH (1644-1709), hetman of the Cossacks, and the hero of Byron's poem, was born in Kiev government, and became page to John Casimir, king of Poland. A nobleman, according to the poem, discovering his wife's intrigue with Mazeppa, caused the latter to be bound naked on a

wild horse and left to his fate. History says that Mazeppa escaped himself to the Ukraine, where he became secretary to the Cossack hetman Samoilowitch. whom he succeeded (1687). He assisted Peter the Great against Turkey, and was by him made Prince of the Ukraine. Later he plotted against Peter with Charles XII., but they were defeated at Poltava. Mazeppa fled to Bender, where he died.

Mazovia, region of Central Poland, usually including Warsaw city and part of modern governments of Warsaw and Siedlee, with most (or all) of Lomza and Plock. From 1138 to 1529 it formed a duchy; in 1529 it was united to the Polish crown; and in 1576 it was made a palatinate by Stephen Bathori.

Mazurka, a national dance which derived its name from Mazovia, Poland, where it originated. It is sometimes accompanied by singing, and its music is usually in 1 or 1 time. The peculiar rhythm of the mazurka was much used by Chopin and by

Wieniawski.

Mazzara del Vallo (anc. Mazara), tn., prov. Trapani, w. coast of Sicily, 13 m. s.s.r. of Marsala. Its citadel and walls (36 ft. high) date from the 11th century. There are sulphur springs. The town exports corn, linseed, barilla, fruit, and oil. Pop. (1901) 20,044.

Mazzarino, tn., prov. Caltanissetta, Sicily, 16 m. s.e. of Caltanissetta. It has sulphur

Caltanesetta. It has sulphur springs, and trades in wine and corn. Pop. (1901) 16,463.

Mazzini, Giuseppe (1805-72), Italian patriot, was born at Genoa; joined the Carbonari (1830); was imprisoned, but fled to Marseilles, where he founded the society. La Giorgie Malia (1831) society La Giorine Italia (1831). After various failures to provoke a rising in Italy (1831-4), he remained in Switzerland till 1837, when he migrated to London. There he founded the journal Apostolato Populare (1841, etc.), and continued his political propaganda. His correspondence was ultimately tampered with by the British government, and he left the country for Paris and Milan. He then again took a leading part in Italian politics, eventually becoming one of the triumvirs at Rome; but he resigned everything when his proposals were rejected, and returned to London in 1850. From there, as head of the Italian National Committee, he continued to direct the operations abroad, which again proved abortive. He edited the Pensiero ed Azione from 1859. His last attempt at raising a rebellion was made at Palermo in July 1870, but was again thwarted. Still, two months

later Mazzini saw the realization of all his hopes and aspira-tions. While Garibaldi was the soldier of United Italy, and



Giuseppe Mazzini.

Cavour its statesman, Mazzini was its idealist and its spiritual founder. All his writings are inspired by the noblest thought, the deepest feeling, and passionate cloquence. His two most sustained efforts are perhaps the Thoughts upon Democracy in Europe and On the Dutics of Man. See the Life and Writings of Joseph Mazzini (6 vols. 1864-70), and the Scritti, Editi ed Inediti di Giuseppe Mazzini (18 vols. 1861-91). See Canestrelli's Bibliogr. degli Scritti di Giu-seppe Mazzini (1893), and the following monographs: Nardi (1872), Saffi (1887), Mario (1891), Oxilia (1902), Gruber (2nd ed. 1902), Peretti (1904), Simoni (1878), Boullier (1885), Schack (1891; Ital. trans. 1892), Conway (1872), Bolton King (1902), Luzio (1905), and Momigliano (1905). See, too, the English collections of Mazzini's *Essays*, by Clarke (1887), Stubbs (1891), and Okey (1894).

Mazzuchelli, Giovanni Maria (1707-65), Italian writer, was born at Brescia. He wrote literary biographics, Scrittori d'Italia (1753-63). Rodella wrote his Life (1766), which has been supplemented by Narducci (1867), and Stranieri (1874).

M.B., Bachelor of Medicine. M.C., Member of Congress, Master of Ceremonies.

M.C.C., Marylebone Cricket Club. (See CRICKET.) M.Ch., Master in Surgery.

M.D., Doctor of Medicine. Mead, an ancient beverage of N. Europe, prepared by diluting honey with water and ferment-ing. The resulting liquid is golden yellow in colour, but rather tasteless and insipid. The modern white and red meads, however, are very different, being flavoured with white, black, or red currant juices. When fermentation is over, a small quantity of brandy is added, the mead bottled, and stored for from six to nine months, when it is in a sparkling and brilliant condition. Cowslip honey yields a mead much superior to that from heather flowers.

Mead, RICHARD (1673-1754), English physician; practised at Stepney, London; wrote Mc-chanical Account of Poisons (1702); was appointed physician to St. Thomas's Hospital, London (1703-54), and physician to George 11. (1727). He advocated inoculation for smallpox. His collection of art treasures is at

Windsor.

Meade, George Gordon (1815 -72), American soldier, born at Cadiz in Spain. He distinguished himself in the Mexican war (1846-48), and in the war of secession at Fredericksburg and Chancellorsville, and was made (1863) commander-in-chief of the army of the Potomac, and defeated the Confederates at Gettysburg (1863), and was then commander under Grant (1864). See Life by Bache (1898), and Pennypacker (1901).

Meadow Saffron. See Col-

CHICUM.



Meadow Sweet. 1. Flower, section.

Meadow Sweet, the popular name of a British herbaceous plant (Spirca ulmaria), which

belongs to the order Rosaceæ. It grows to about three feet in height, and is common in moist meadow land, and alongside of streams and ditches. It has pin-nate leaves, and bears in late summer small, densely crowded, yellowish-white, fragrant flowers.

Meadville, city, Pennsylvania, U.S.A., co. seat of Crawford co., 85 m. N. of Pittsburg. It has machinery works and woollen mills. Here is Allegheny College (300 students). Pop. (1900) 10,291. Meagher, THOMAS FRANCIS

Meagher, (1823 67), Irish patriot, born at Waterford; joined the Young Ireland party, and was sentenced to death in 1848, but exiled for life to Van Diemen's Landinstead. He escaped in 1852 to the United States, where he organized the Federal Irish Brigade in 1861. He became secretary for Montana, and was drowned in the Missouri.

Meagre, or MAIGRE (Sciæna aquita), a fish found occasionally off British coasts, also at the Cape of Good Hope and on the s. coast of Australia. It may reach a length of six feet, and was greatly prized by Roman epicures. may be recognized by the short first dorsal fin, the elongated second dorsal, the deep and oblique cleft of the mouth, and the continuous lateral line, which extends over the tail-fin. Barbels are absent.

Meal Tub Plot. See DANGER-FIELD, THOMAS.

Meal-worm, the larva of the beetle Tenebrio molitor, abundant in flour mills, bakehouses, and similar localities. It is about an inch in length, and is slender and cylindrical in form, and of a tawny colour. The adult beetle

is about half an inch in length, and is black above and reddish beneath. The larva is often given to cage birds.

Mealy-bugs. See Coccus In-SECTS.

Mean, in philosophy, the term used to designate briefly an ethical doctrine of Aristotle, according to which virtue is defined as a habit of choosing the mean between the two extremes of excess and defect in action and feeling. This doctrine is sometimes superficially taken as a mere counsel of moderation, and even a more academic criticism has charged Aristotle with making the distinction between virtue and vice merely quantitative. But excellence of conduct, says Aristotle, depends on the attainment of a true balance in action and feeling, regard being had to all the circumstances of the case. See Stewart's Notes on the Nicomachean Ethics (1892), vol. i., p. 193 f., or the essay in Grant's edition, vol. i. (2nd ed. 1886).

Mearns, The. See Kincar-

DINESHIRE.

Measles, an acute, highly-infectious fever. There are comparatively few cases among adults; but that is partly because one attack protects to a great extent, and most people are attacked in childhood. German measles is often mistaken for the true measles. A race seems to a certain extent inoculated in the course of generations; for in Fiji, in 1875, where measles was not previously known, over one-third of the whole population died in three months. Infection is almost always direct; but cases are recorded where it has been carried by a third person, or by books or clothing. The breath, and discharges from the mouth and nose, are the common vehicles of infection. The incubation period varies between seven and eighteen days, but fourteen days is a common time. The sufferer then feels a general discomfort, with symptoms of a feverish cold, running at eyes and nose, with headache, possibly nausea and vomiting, or even convulsions in serious cases in children. At this time there may be a prodromal or pre-liminary rash. The true rash appears about the third or fourth day, with a second and greater The rash rise of temperature. takes the form of slightly raised patches, which are softer and more velvety to the touch than those of smallpox. The inside of the mouth often shows redness before there is an exterior rash. 'Koplik's spots,' when present, are thought to be absolutely sure signs of measles. They are red spots on the inside of the cheeks, opposite the double teeth, with bluish-white centres. Measles is most infectious before any rash appears. The child is generally much easier directly the rash is well-developed, and three or four days later the temperature falls. Inflammation of the throat, ears, and lungs are common complications. Also bronchitis must be carefully guarded against, and the eyes, nose, and ears kept clean from any discharges. bronchitis in measles is believed by many to be particularly infectious. It is also likely to lead to pneumonia of a bad type. Cases of bronchitis with measles should therefore be kept apart, even from other children with measles. Suppuration in the middle ear is a common accompaniment of inflammation there. Deafness is apt to follow if it is neglected. It is because of these complications, and also because measles is often neglected by parents, that the death-rate reaches 13,000 an-

nually in England and Wales.

Treatment.—The patient should be guarded from cold, kept in bed, and fed on milk diet; and the room must be darkened partially

or entirely. Frequent hot drinks encourage the rash to appear. A 'suppressed' rash is always a bad sign. A hot bath, carefully given about the fourth day if necessary, may cause it to show. Antipyretics and sponging are used for very high temperatures, with ipecacuanha and squills for any very troublesome cough; also a small bit of mustard leaf just at the root of the neck, for the cough. Bed should be kept for a week at least after all fever has gone; and unless weather is very favourable, the child should not leave the house for a fort-night more. Infection is believed to be possible for two weeks at least after the appearance of the rash. The skin peels in fine, dusty particles, and warm baths help to get rid of it. In German measles all the symptoms are lighter, temperature keeps lower, and the rash is often the first sign of any trouble.

Measures. See Weights and MEASURES.

Measuring Instruments, ELECTRIC. See AMMETER, ELECTRICATION OF THE PROPERTY OF TROMETER, etc.

Meat Extracts and Essences, preparations of food containing more or less nourishment in a semi-soluble form. They are They are stimulating, and contain much nourishment in an uncoagulated

and digestible state.

Meath, maritime co., prov. Leinster, Ireland, having a coastline of about 10 m. between Louth and Dublin. The surface is generally level or undulating, forming part of the great central plain. The principal river is the Boyne, and in the s. is the Royal Canal. Pasturing and agriculture are the chief industries; coarse linens and woollen goods are manufactured. The county returns two members to Parliament. There are many remains of ancient castles and monasteries; Kells is famous for its ecclesiastical antiquities, and Tara is the traditional site of the early Irish capital. Area, 904 sq. m. Pop. (1901) 67,497.

Meaux, tn., dep. Seine-et-

Marne, France, on Marne R., 25 m. N.E. of Paris. Its cathedral dates from the 12th century. The town trades in cheese, corn, eggs, and poultry. Sugar, cotton-cloth. and steel are manufactured, and there is a wool market. The town was besieged by the English in 1520. Pop. (1901) 13,690.

Mecca (Ar. Makkah or Bakkah) cap. prov. Hejaz. Arabia, in 21° 25' N. and 40° 15' E., 70 m. E. of its port, Jedda. As the birthplace of Mohammed, and the scene of the annual side. scene of the annual pilgrimage (haji), it is the holy city of the Mohammedan world. It stands in a narrow valley surrounded by bare hills; the new town has almost a European aspect. Mecca

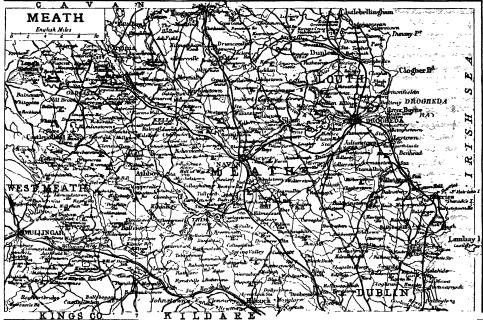
has always been a centre of trade, but its industries are now confined to pottery and articles for sale to pilgrims. One of the most important of the sacred rites is to walk seven times round the Kaaba, a massive cubelike structure, said to have been founded by Abraham. Its four sides are covered with black silk, which is annually renewed at the time of the haij. This covering, which is known as the 'holy carpet,' is sent every year from Cairo, and is carried in procession from Jedda to the city. Openings in the silk are left to show two sacred stones. The black stone at one of the angles is a special object of veneration.

Spaniard (1807); Seetzen (1809); Burckhardt (1814-15; Travels in Arabia, 1829); Burton (1853; see his Personal Narrative of a Pitgrimage to El-Medinah and Meccah, 1855); Bicknell (1862); Von Maltzan (1864); Kenne (1880); Snouck - Hurgronje (1884-85; Mekka, 1888-9); and Courtellemont (1894). See also Snouck-Hurgronje's Het Mekkaansche Erest (1880).

Mechanical, a term which, when used in physical science, means the uniform and invariable effects that result from the interaction of quantitatively determinate elements, according to quantitatively determinate laws. Since the time of Kant, mechanical in

sides Kant's Kritik of Judyment and Lotze's Microcosmus, see Janet's Finul Causes (1878), and James Ward's Naturalism and Agnosticism (2nd ed. 1903).

Mechanics, a term which has undergone a change of meaning within the last thirty years. Formerly it was divided into two sections, rational mechanics and applied mechanics. To these might be added practical mechanics, which, however, could be included in the applied section. Rational mechanics was divided into statics and dynamics. Since the publication of Thomson and Tait's Natural Philosophy, however, the term dynamics has been used in the wider sense of what



Bartholomer: Educat

The Kaaba stands in a mosque enclosure capable of holding 35,000 people. Another item in the pilgrimage rites is to run seven times between the two mounts, Safa and Merwa; and a third is to stand in prayer and listen to a sermon on the sacred mount of Arafat, outside the city, on which Mohammed prayed. The permanent residents are estimated at 50,000; the pilgrims sometimes number 100,000. Non-Mohammedan visitors enter it at the risk of their lives. The following, however, have spent some time in the place:—Ludovico de Varthema (1510; Eng. trans. vol. xxii. of the Hakluyt Society's publications); Joseph Pitts of Exeter (1704); Badia, or Ali-Bei, a

this sense has been sharply opposed to organic or teleological. But it is a matter of controversy how far the distinction is to be accepted as ultimate, or whether science should not rather take as its (no doubt very remote) ideal the reduction of chemical and physiological processes to physical terms. It may be held, however, even where the universality of the mechanical view of nature is fully accepted, that the me-chanical aspect of things is only a partial, external, and subordinate aspect, an abstraction from their full reality, and that the inner reality of things is spiritual or teleological. See Külpe's Introd. to Philos. (Eng. trans. 1897); for more ample discussions, be-

was formerly included under rational mechanics, and the sub-division became statics and kinetics. The term mechanics is now rightly applied to the more practical side of dynamical science, and corresponds with what was formerly called applied mechanics. The distinction between dynamics and mechanics may be illustrated thus. The theory of elasticity and the relations between stress and strain under various conditions are discussed under dynamics; in mechanics the results are applied to the important cases of pressures within boilers, the bending of beams and the torsion of shafts-to problems, in fact, which have a direct bearing upon engineering structures.

Mechitarists, a sect of Armenian Christians, who derive their name from Mechitar da Pietro (1676-1749). In 1701 Mechitar instituted at Constantinople a society for the intellectual and spiritual improvement of his countrymen, but was forced by the persecution of the Armenian patriarch to betake himself, with his adherents, to the Morea, from which again they migrated to Venice (1712), which granted them the island of San Lazzaro. Here they still continue their labours, mainly in the publication of Armenian works, while they have also an academy at Vienna (founded 1810).

Mechlin. See Malines.

Mecklenburg, two grand-duchies of the German empire (Mecklenburg-Schwerin and Mecklenburg-Strelitz), lying s. of the Baltic Sea. The surface is generally flat, but diversified by the Baltic ridge of the North German plain. Area, including Mecklenburg-Strelitz, 6,266 sq. m. Pop. (1900) 710,372. Agriculture, the most important industry, has reached a high development velopment. Sugar and starch factories, breweries and distilleries, and the making of machinery and bricks are the other industries of moment. Salt and gypsum are extracted. The capital of Mecklenburg-Schwerin is Schwerin; of Mecklenburg-Stre-litz, Neu-Strelitz. The population of the towns and the landowning class are of Lower Saxon descent, the rural population mostly of Slav descent. The currentlanguage is Platt-Deutsch, or Low German. There is a university at Rostock. Mecklenburg-Schwerin has two votes and its sister duchy one vote in the Imperial Federal Council. The former sends six members and the latter one member to the Imperial Diet. The existing duchies date from 1701, the title of grandduke from 1815.

Meconopsis, a genus of hardy herbaceous plants belonging to the order Papaveracea. They bear large showy flowers. One species is native to Britain, M. cambrica, the yellow Welsh poppy.

Medal, a circular piece of metal issued to record or commemorate an event or a person, and embellished with devices and inscriptions representative, symbolical, or connected with its particular purpose. Originally the word was applied to minted money—i.e. coins—also, but it is now used only in the exclusive sense indicated. Almost invariably a medal is decorated on both sides. Probably the first distinct series of medals in the modern sense are the Roman medallions issued between the 1st and the middle

of the 4th century. They are usually in bronze, though a few in the precious metals have been found, about one and a half inches in diameter, and like the



(1.) Albert Medal.



(2.) Conspicuous Gallantry Medal.



(3.) Good Conduct Medal.

British Naval Medals.

contemporary copper money of Rome, they were struck from engraved dies; but from the fall of the empire until the beginning of the 15th century medals are almost unknown. A revival then

produced many fine examples, and those wrought by Vittore Pisano (c. 1380-1456), Matteo de Pasti, and other artists of that century, are unsurpassed in beauty and style. These pieces were not minted, but were modelled and cast by the circ verdue process; and, taking full advantage of the method and of the fact that they were intended for mementoes, and were in consequence not subject to the rapid deterioration involved in constant circulation as coins are, Pisano and his contemporaries modelled their designs in higher, bolder, and more expressive reliefs. But in the following century, although the larger medals continued to be cast, a return was made to minting by engraved dies, and Benvenuto Cellini executed some fine pieces in that manner. On the north side of the Alps the Germans, and specially the Nurembergers, including Albert Dürer, produced some fine medals in mediaval times; while in 16th and 17th century France, Jacques Primavera, Germain Pilon, and Georges Dupré were the chief workers. The great events of Dutch history in these two centuries also were recorded in medals by native artists. In England a small number of portrait medals were produced in the reigns of Henry VIII., Edward VI., and Mary, and with the succession of Elizabeth we have the beginning of commemorative medals. The leading events and some of the chief persons in the two reigns following are found on medals, and Abraham and Thomas Simon executed some of the finest English medals for the Parliament and Cromwell. The Simons and Rawlins were em-ployed by Charles II., but the extensive series of medals which marks the period of William and Mary, and of Anne, is chiefly by Dutch engravers. The medal-Dutch engravers. The medal-lists employed in Britain during the 18th century were foreigners, like their predecessors, but they were less able; and, while Pistrucci modelled the spirited St. George which figures on the British sovereign, the majority of English medals produced in the first half of the 19th century were also of no great account. In most of them, and indeed in almost all European medals of the period, the perfecting of coins for commercial use had resulted in decadence use had resulted in decadence in the art of medal-making, and it was not until about 1870 that a revival began. It originated in France, where David d'Angers had been producing excellent portrait medallions on a scale somewhat larger than medals; but it was not until L. O. Roty and J. C. Chaplain, Alphonse

Legros, Michel Cozin, Charpentier, and their followers took it up that the art regained real artistic qualities within its own conventions. Many of the medals and plaquettes—as rectangular medals are called—produced by these artists possess the highest merits, and in France they are used to commemorate or mark private as well as public events.

private as well as public events.
It was in 1643 that Charles I. gave the first British military medal. The earliest modern British military medal is the general service medal (1793-1844), issued about the latter year with clasps for the Peninsula and Waterloo campaigns. Following this in quick succession came the medal for the storming of Seringapatam (1799), and the first Indian medal. For smaller wars, such as those on the In-dian frontiers and in Nigeria and Somaliland, general service medals are awarded, with distinctive clasps. There is also a medal awarded for long service and good conduct. The first battle for which a clasp or bar was awarded was Talavera (1809). All British war medals bear the effigy of Queen Victoria, with the exception of the King's medal for S. Africa. The Victoria Cross, granted for acts of conspicuous bravery, is the most prized of British war medals. Unofficially, medals are awarded by learned and other societies for various special distinctions. Naval medals consist of the following:-(1.) The Albert Medal instituted in 1866 as a reward for mariners and others for saving life at sea, and extended (1867) to acts of heroism on land as well as by sea. (2.) The medal for Conspicuous Gallantry, silver. instituted in 1874, for petty officers and seamen of the royal navy, and for non-commissioned officers and men of the royal marines, accompanied by a gratuity up to £20. (3.) Good Conduct medals, awarded to men of the same rank and ratings as above, the qualification being ten years' service, while a gratuity of £20 or less is qualified for by fifteen years' service. Besides these, there are a number of medals awarded to officers for professional attainments. (1) The Gilbert Blane Gold Medal and (2) the Goodenough Told Medal, dealt with separately; (3) the Royal United Service Institution Gold Medal is awarded annually, with an honorarium, for the best naval or military essay alternately; (4) the Stanhope Gold Medal is conferred annually by the Royal Humane Society for the most gallant act of the year in saving life. See Irwin's War Medals and Decorations (2nd ed. 1899); Long's Medals of the British Navy (1895);

Tancred's Historical Record of Medals (1891); Carter's War Medals of the British Army (ed. 1893); Von Rabriczy's Italian Medals (Eng. trans. 1905); Rondot's Les Médailleurs ... en France (1905).

Medea, in ancient Greek legend a daughter of Æëtes, king of the Colchians. When Jason reached Colchis in quest of the golden fleece, Medea fell in love with him, helped him by her magic to obtain the fleece, and escaped with him to Greece. She killed Pclias in revenge for his treatment of Jason's father, and she and Jason were exiled to Corinth. There, when Jason desired to marry the daughter of the king, Creon, Medea destroyed the princess by means of a poisoned robe, killed her two sons by Jason, and then fled to Athens. Herstory has been dramatized by Euripides, Corneille, and Grillparzer.

Medellin, chief town and episc. see, dep. Antioquia, Colombia, S. America, 150 m. N.W. of Bogotá. Owing to its rich mines it is the largest town in the republic

after Bogotá. Pop. (1902) 53,000. Medford, city, Middlesex co., Massachusetts, U.S.A., 5m. N.N. w. of Boston, of which it is a residential suburb. It is the seat of Tufts College. It manufactures bricks, machinery, and chemicals. Pop. (1900) 18,244.

Medhurst, Walter Henry (1796-1857), English missionary, was born in London; and in 1816 became a missionary printer at Malacca, where he was ordained (1819). He laboured at Penang, Batavia, and Shanghai; founded the orphan asylum at Parapatta, near Batavia in Java; and wrote China, its State and Prospects (1838), a Chincee Bible (1838), English and Japanese Vocabulary (1830), Chinese and English Dictionary (1842-3), Chinese Dialogues (1844), and Chinese Theology (1847).

Media, anc. country of Asia, lay s. of the Caspian, in modern Persia. Its kings appear first as vassals of Assyria. About 700 B.C. Deioces threw off the Assyrian yoke; about fifty years later Phraortes conquered Persia; and his successor, in alliance with Nabopolassar, king of Babylon, destroyed the Assyrian kingdom (about 607 B.C.), and divided its territory. Cyaxares extended the rule of Media w. as far as the Halys; and was about to attempt the conquest of Lydia, when an eclipse of the sun (May 28, 585 B.C.) ended a battle between the Medes and Lydians, and led to a peace. Cyaxares's successor, Astyages, was overthrown by a revolution, which transferred the power over the united Medes and Persians to the Persian section and its ruler Cyrus. Henceforward the history of Media is that of Persia, though the Medes rose

against the Persian supremacy twice-in 510 B.C., supporting the pretender Gaumata or Gometes against Darius I., and again in 408. Alexander the Great conquered Media, with the rest of the Persian empire, about 330 B.C. After his death Media was part of the kingdom of the Seleucidae. until the Parthians conquered it in the second century B.C.; later still it was part of the second Persian empire. The Medians were of Aryan race, closely akin to the Persians, and professed the Zoroastrian faith. See Lenormant's Sur la Monarchie des Mèdes (1871), Oppert's Le Peuple et la Langue des Mèdes (1879), and Rawlinson's Five Great Monarchies (1879).

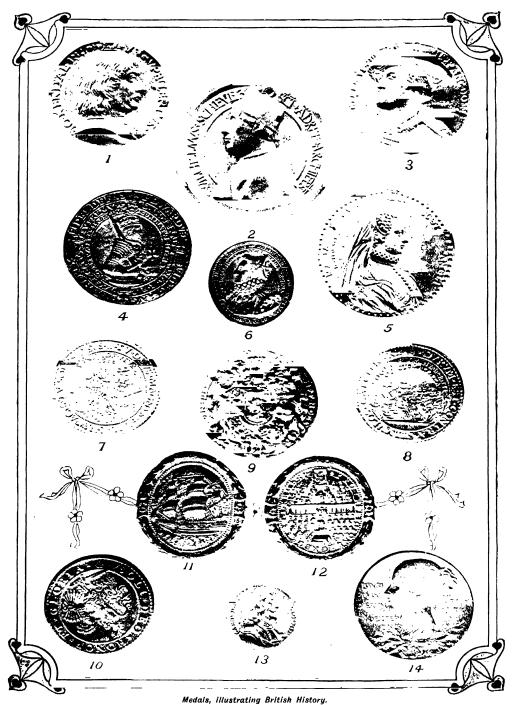
Medians, of a triangle, are lines drawn from the vertices of the triangle to the mid-points of the opposite sides.

Mediation, ACT OF, the Swiss constitution of Feb. 19, 1803, which Bonaparte substituted for that of the Helvetic republic, and which lasted to the end of 1813. In it Switzerland was first officially used as the name of the Swiss confederation.

Mediatization, the deprivation in the case of several ecclesiastical and lay principalities of Germany, of their sovereign rights as imperial free states in the years 1801-6, by making them subject to other German states.

Medicago. See Medica. Medical Association (Brit-Isii) was founded at Worcester in 1832 as the Provincial Medical and Surgical Association. Its aims were the advancement of medical science and the maintenance of the dignity and welfare of the profession. In 1856 the name was altered to British Medical Association. It is now a federation of local medical societies, and publishes weekly The British Medical Inducation. Before

a candidate's name is entered on the student's register, he must be at least sixteen years of age, and must have passed a satisfactory examination in general knowledge. After registration he must devote five years to study before submit-ting himself for his final examination for a qualifying diploma. The subjects of study are: (1) physics, (2) chemistry, (3) elementary biology, (4) anatomy, (5) physiology, (6) materia medica, (7) pathology, (8) therapeutics, (9) pathology, (6) materia meures, (9) medicine, (10) surgery, (11) midwifery, (12) vaccination, (13) forensic medicine, (14) hygiene, and mental disease. The regulations of the mental disease of the student of the mental disease. (15) mental disease. The regulations ensure that the student devotes a considerable part of his time to clinical and practical work. The final examination is held in the more advanced subjects - medicine, surgery, mid-



measus, mastraing British History.

1. John Kendal, prior of the Hospital of 8t, John of Jerusalem in Landon: first metal portrait of a Scotsman, 1491.

3. Honry vir., 1524. 4. Edward vir., first.

5. Mary Queen of Scots, 1572. by Primaevas. 6. Queen Elizabeth, 1574. 7, 8. Defend of the spanish A the Spanish fleet, on the other the enemies of the Queen Szitzick (the Pop., the Emperor, the King of 13. Charles 1., the

Englishman, 1480. 2. Archbishop Schevez mation medal executed in England, 1546, mda, 1588; on the one side the defeat of 9. Arms of James vi. of 1 8 1., 1642.

wifery, and clinical work. The British universities teach several extra subjects, such as botany and natural history, and they examine students upon these subjects. In other European countries a course of four years is generally the minimum period of study. On the other hand, the entrance examination is usually more searching. In the United States the standard was low in many of the states, but there has been of recent years great and rapid improvement, and several states now require a minimum course of four years. Degrees and licences granted by continental or by American universities or colleges do not confer upon recipients the right to register as qualified practitioners in Britain. See also Medical Practitioner.

Medical Jurisprudence, or FORENSIC MEDICINE, is 'the science which teaches the application of every branch of medical knowledge to the purposes of the law.' Expert medical evidence is required to establish the facts which have to be ascertained in connection with a large variety of legal questions both in criminal and in civil cases - e.g. questions as to the cause of sudden or violent death or poisoning, and questions connected with infanticide, abortion, rape, legitimacy, impotence, sterility, and every form of insanity. See Taylor's Manual of Medical Jurisprudence (12th ed. 1891), and Husband's Student's Handbook of Forensic Medicine (7th ed. 1904).

Medical Officer of Health. See Public Health.

Medical Practitioner. Medical Acts of 1858, 1859, 1860, 1876, and 1886, which also apply to Scotland, provide for the qualification and registration of medical men. A certain qualification is necessary for registration. The three qualifications most commonly found are: (1) a fellow, member, or licentiate of one of the recognized colleges of surgeons or physicians; (2) a doctor or bachelor of medicine of one of the universities; (3) a licentiate of the Society of Apothecaries (see APOTHECARY) of London, or of the Apothecaries' Hall, Dublin. A registered practitioner is entitled to recover at law his charges and fees, unless he is a fellow of a college of physicians which prohibits its fellows by by-law from suing. Registration is not compulsory, nor can any penalties be inflicted upon an unregistered practitioner, if he is qualified. But no unregistered practitioner can recover at law his charges or fees, or hold a public medical appointment. An unqualified person is, of course, debarred from suing for his charges, and can be proceeded against for penalties by any of the medical corporations whose jurisdiction he has infringed. A person who 'wilfully and falsely' pretends that he is, or uses the title of, physician or surgeon, or any title implying that he is registered, is liable to a fine of £20 upon summary conviction. The General Medical Council, which is partly dominated and partly represen-tative, has disciplinary powers to remove practitioners from the register for infamous professional

conduct.

Medici. a Florentine family which first came to the front in the 14th century; but the real founder of the greatness of the house' was Giovanni de' Medici (?1360-1428), who by banking and commerce amassed enormous wealth. His son, Cosimo (1389-1464), was also an able financier, who greatly increased the wealth and influence of the family, until, through the jealousy of the oligarchical party, he was banished to Venice (1433). But he was recalled next year, and from that time till his death he was uncrowned king of Florence.' Yet wisely and well did he direct her destinies. No mean scholar himself, he was the friend and helper of the Italian humanists, and may almost be styled the foster-father of the new learning; for his agents ransacked Constantinople, and scoured continental Europe, Greece, and the Levant for MSS. of the Greek and Latin writers, which were transcribed by his staff of copyists, and made available for the use of scholars. He also founded the Platonic Academy in Florence, and fostered the arts and then known sciences. Cosimo left only one legitimate son, Piero (1419-69), who held power for five years, and died, leaving two sons, Lorenzo and Giuliano (1453-78). Lorenzo (1448-92), surnamed 'the Magnificent,' was not only one of the most distinguished scholars of the age, but as a poet, both in Latin and in the vernacular, he rivalled Angelo Poliziano himself, while in every branch of art and science he was well versed. For nearly twenty-three years he ruled Florence with wonderful skill, his policy being to work against Venice in alliance with Milan. His collection of MSS, and of books (for he was an early patron of printing), of pictures and objets d'art. was one of the finest in Europe. He was succeeded by his eldest son, Pietro the younger (1471-1503), who only held power for two years. He was a weak, vicious youth, who, when Charles VIII. of France invaded Italy in 1494, basely surrendered all the advantages his predecessors had

won. In consequence the Medici were expelled from Florence; and when they were reinstated in power by Leo x., they were represon of Pietro the younger, in whom the direct line of the Medici came to an end. After the siege of Florence (1530), when the Medici were a second time re-instated as 'dukes of the republic of Florence,' and in 1567 as grand-dukes of Tuscany,' it was an illegitimate descendant of Lorenzo, brother of Cosimo, who assumed the honours, which his descendants held till 1737, when Austria annexed Tuscany, expelling the seventh and last grand-duke, Giovanni Gastone.

Another illustrious member of the Medici family was Giovanni (1475-1521), the second son of Lorenzo the Magnificent, who became Pope Leo x. (See that article.) Giulio (1478 - 1534), illegitimate son of Giuliano, younger brother of Lorenzo, also became Pope in 1523 as Clement VII. See Symonds's Italian Renaissance (1875-86); Roscoe's Lorenzo de' Mcdici (new ed. 1890); E. Armstrong's Lorenzo de' Medici (1896); Reumont's Lorenzo de' Medici (Eng. trans. 1876); Oliphant Smeaton's Medici and the Italian Renaissance (1901).

Medici, CATHERINE DE'. See CATHERINE DE' MEDICI.

Medici, MARIE DE'. MARIE DE' MEDICI. See Medicinal Herbs. The old herbalists largely based their practice on the so-called 'doctorine of signatures,' according to which the several herbs have legible characters stamped upon them, to show what evil they will most readily cure: Viper's bugloss hath its stalks all speckled like a snake or viper, and is a most singular remedy against poison and the sting of scorpions.' Dandelion, centaury, meadow-sweet, and wild-sage (wood-sage) were used as 'bitters' Angelica was put in the forefront of all medicinal plants; the dried leaves were said to have great power to reduce inflammation after being steeped in hot water. Mallows, especially marsh mallows, retain their old reputation for relieving the same ill. Elder leaves and buds are used in drinks, poultices, and ointments. Primrose, poor man's friend (hedge garlic), and comfrey are together made into an ointment; but white comfrey should be used when the ointment is for a woman, red-flowered comfrey when it is for a man. juice of house-leek, mixed with cream, relieves inflammation, and particularly the irritation which follows vaccination in an arm taking beautifully. Probatum est, penny-pies, or penny-wort (Cotyledon umbilicus) is said to

be equally efficacious, especially when used with cream, and when simmered against the 'sides of the pan.' Marigold tea is a widely administered remedy for measles. pan.' Saffron also was recommended for the same ailment. An infusion of furze blossom used to be given to children to drink in scarlet fever. In a fomentation camomile heads are a recognized anodyne; and wild camomile and red pimpernel are given locally for asthma. Boy's love (southernwood), plantain leaves, black currant leaves, elder buds, angelica, and parsley, chopped, pounded, and simmered with clarified butter, make an oint-ment for burns or raw surfaces. Sage poultices and sage gargle are very good for sore throats, and red sage is better than green. Rosemary has long been celebrated for making the hair grow. The expressed juice of watercress is in repute as a cure for rheumatism. Parsley, freshly gathered and laid on the forehead, is good for a headache, and is said to be beneficial if put in a fold of muslin and laid across inflamed eyes. Endive tea is cooling, and is given to 'fever' patients; and the dry leaves of lovage infused in white wine were good for ague. An infusion of raspberry leaves, agrimony, and barberry bark was good for consumptive patients. Coltsfoot is still given for coughs. Sweet marjoram was administered for dropsy, elder berries for boils, arb-rabbit (herb-robert) made into poultices for 'inflammation,' brook lime given for St. Anthony's fire; and brown nut, made into a decoction, was taken hot just before going to bed, for a cold. Among the more important plants now officially recognized by physicians are foxglove or digitalis, belladonna, squill, poppy, aloe, rhubarb, henbane, nux vomica, cinchona, hemlock, aconite, stramonium, and jalap.

Medicine, HISTORY OF. Medical science is a product of the Greek mind. In many temples of the Greek islands the priests were supposed to be descendants of Æsculapius, and they formed a hereditary caste of physicians. In these temples the serpent was worshipped as a symbol of eternity, and a cock was commonly sacrificed to Æsculapius by grateful devotees. The most famous of the Æsculapian priests was Hippocrates, who lived about 400 B.C., and was educated at Kos. Some of his books have survived. His methods of diagnosis, his clinical maxims, and some of his sayings live for all time; but his work was founded more upon clinical observation than upon anatomical knowledge. Later, the Greek colonists of Egypt established a school of truly scientific medicine. Of the many famous names associated with the Alexandrian school, that of Galen is the greatest. He lived about Unlike Hippocrates, he 140 A.D. was a skilled anatomist, and he was also a bold pioneer in all the provinces of medicine. So dominant were his ability and reputation that for thirteen hundred years medical science remained stereotyped as he left it. Science. however, still flourished among the Arabs of Bagdad and Cordova, who inherited from the Greeks the knowledge which Christians ignored or despised; and the names of Avicenna and Averages yet shine in the annals of medicine. Famous schools of medicine arose at Pisa and Padua in Italy, and at Montpellier in France, in the 13th and 14th centuries, and gradually took the place of that of Salerno. Other distinguished medical schools of older date were those of Paris and Bologna. Many of the old Greek works were retranslated from the Arabic Mss., in which alone they were extant. But the yoke of Galen and Aristotle bore heavily on mankind, and it was only with the advent of independent thinkers like Vesalius (1514-64) and Servetus (1511-53) that medical science again marched forward. At the opening of the 16th century the strange figure of Paracelsus (c. 1490 1541) appears preeminent. But a greater than Paracelsus arose in England, and gave the deathblow to the cult of Galen. In 1628 William Harvey published his views on the circulation of the blood, and revolutionized medicine. In the same year was born Malpighi, who in 1661, by means of the microscope, demonstrated the microscope, demonstrated the passage of blood from arteries to veins through the capillaries. From 1628 modern medicine may be said to take its rise. By the discovery of vaccination Jenner almost eradicated the scourge of smallpox; and he prepared men's minds for the ideas of Lister, Pasteur, and Koch, whose germ theory threw a new light upon many diseases, and led not only to better methods of cure, but to hygienic measures for the prevention of infection. After Jenner's time the two most important events in medical history are the introduction of anæsthetics and the development of antiseptic principles. If the discovery of anasthetics cannot be placed entirely to the credit of Sir James Simpson, it may at least be said that he added anæsthesia to the armamentarium of surgeons and obstetricians, and swept away the horrors of the old operating theatre. Equally far-reaching was Lister's great work, which transformed hospitals from hotbeds of disease into clean, germ-free sanatoria. About the middle of the 19th century a second renaissance may be said to have begun in the scientific world. Virchow published his great work on cellular pathology; Darwin promulgated ideas that have influenced all scientific thought; Kech improved the methods of bacteriological research; Pasteur investigated the problems of fermentation, and Lister applied Pasteur's results to surgery. At the same time medical men began to use more accurate instruments and methods of diagnosis. In 1816 Lacance invented the stethoscope, and a little later the value of the clinical thermometer, the microscope, the ophthalmoscope, and the laryngo-scope came to be widely recog-



Medick (M. falcata).
1, Flower; 2, fruit.

nized. More recently still, success has followed efforts to combat by antitoxin treatment many of the diseases due to germs, especially diphtheria. Koch's discovery of the tubercle bacillus, and the consequent modification of the treatment of tubercular affections, have been followed by a marked diminution in the mortality from phthisis. In certain other diseases amelioration of the symptoms has been found to follow the administration of ex-tracts from the glands of lower animals. The most notable instances are the cure of myxeedema and the relief of cretinism by the administration of thyroid extract. Within the last few years, the discovery of Röntgen rays and of radium has furnished the medical world with powerful new weapons for the diagnosis and treatment of disease. See Hisor's Lehrbuch der Geschichte der Medizin (3rd ed. 1875-82), Pagel's Geschichte der Medizin (1897), Daremberg's Histoire des Sciences Médicales (1870), and Sprigge's Médicine: its Practice and its Public Relations (1905).

and its Public Relations (1905).

Medick, or Medicago, a genus of hardy herbaceous plants belonging to the order Leguminosæ. They bear trifoliate leaves and yellow or violet flowers, usually not of such striking beauty as to obtain a place in the garden. The purple medick or lucorne (M. sativa) is of agricultural importance. (See Alfalfa). M. falcata, a hardy perennial, is a native of Britain; it bears axillary racemes of yellowish flowers, and is of prostrate labit.

Medina, walled city, prov.

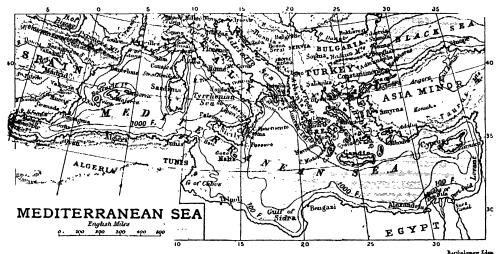
history of Spain from 1445. One duke commanded the Spanish Armada. Pop. (1900) 11,040.

Medinet - el - Fayum, city, Middle Egypt, cap. of prov. Fayum, on Bahr Yusuf, or Canal of Joseph, 56 m. s.w. of Cairo; manufactures woollen stuffs. It is the site of ancient Arsinoë. Pop. (1900) 40,000.

Medinilla, a genus of tropical evergreen shrubs belonging to the order Melastomaceæ. They bear panicles or cymes of white or rose-coloured flowers, followed by globose or ovoid berries. They require a light peaty soil and heat and moisture.

Mediterranean Railways.
The Italian Company of Mediterranean Railways was established in 1885. The lines run from Ventiniglia and Modane, on the frontier of France,

and deeply indented with bays and gulfs, and on its African or s. coasts it is comparatively unbroken. Many good harbours are found along its shores, and from the very earliest times its commercial importance has been great. The Mediterranean is divided into two sections by the Italian peninsula, Sicily, and the submarine ridge, usually called the Adventure Bank, which stretches between Sicily and Cape Bon in Africa. This narrow strait has a depth of about 600 ft. The w. basin has an average depth of 5,280 ft., and the greatest depth (10,322 ft.) is found to the w. of Sardinia. The E. part is almost all deeper than 5,000 ft., and the greatest depth, the Pola Deep (14.436 ft.), lies between Malta and Crete. At the Strait of Gibraltar the depth



Hejaz, Arabia, 240 m. N. of Mecca; is second only to Mecca in sanctity, being the scene of Mohammed's work after the Hejira or flight from Mecca (Friday, July 16, 622 A.D.). Mohammed's tomb (Hujrah), behind the mosque where he died, has a green cupola and four tall towers. Abu-Bekr and Omar are buried in the same spot. The city is in decay, but its surrounding gardens give it a pleasing air. Non-Mohammedans are rigidly excluded, as at Mecca; but Burckhardt (1811) and Sir Richard Burton (1852) have visited it. Burton estimated the population (1852) at 16,000. A later estimate gives 48,000.

Medina Sidonia, city, prov. Cadiz, Spain, 20 m. s.e. of Cadiz; is a picturesque place on a mountain slope. Its palace was the ancestral seat of the dukes of Medina Sidonia, who figure largely in the

through the north-western provinces, connecting Turin, Milan, Parma, Genoa, etc., with Florence, Rome, and Naples, and down the western and southern coasts to Reggio, Metaponto, and Brindisi—a total length of 3,575 m. In 1890 the Roman Secondary Railways, connecting Rome with Albano and Nettuno, were acquired.

Mediterranean Sea, The, the 'great sea' of the Bible, and the Mare Internum of the Romans, is nearly landlocked. It communicates to the W. by the Strait of Gibraltar with the Atlantic, and to the E. by the Dardanelles or Hellespont, the Sea of Marmora, and the Bosporus with the Black Sea. Its total length is about 2,400 m.; its maximum breadth is 1,030 m. Along its European or N. shores it is broken by several peninsulas

nowhere exceeds 6,000 ft. salinity of the Mediterranean is slightly greater than that of the Atlantic. In summer the surface water is usually a few degrees higher than that of the Atlantic in the same latitude, but in winter there is little variation. The Mediterranean is not quite tideless, though in no part does the tide rise very high. Near Venice tide rise very high. Near Venice it reaches 3 ft., while off the island of Zante the rise is only 9 in. There are several local 9 in. There are several local winds: the bora is found from Trieste along the whole coast of Dalmatia; the sirocco, a violent, dry, dust-laden s. wind in Malta and Sicily; the leveche in s.E. of Spain; and the solano, a moist E. wind in S.E. of Spain. From the Atlantic there is a constant surface current into the Mediterranean, and from the Black Sea also. There are 400 species of European fishes found in the Mediterranean, some of these being peculiar to it. The sponge, tunny, and sardine fisheries are important. Red coral is abundant off the Balearic Is., Sicily, Tunis, and Tripoli. Earthquakes are not infrequent along its shores, while submarine earthquakes are both numerous and violent. Active volcanoes are found at Etna, Vesuvius, and Stromboli. The chief islands are the Balearic, Sardinia, Corsica, Sicily, Crete, and Cyprus. The chief rivers entering it are the Ebro, Rhone, Po, and Nile. The total area is estimated at 1,000,000 sq. m. See Playfair's The Mediterranean, Physical and Historical, in Smithsonian Institute Report (1890); also Smyth's The Mediterranean, Memoir Physical, Historical, and Natural (1854).

Medjidieh, an Ottoman (Turkish) order and decoration, instituted in 1852 by Sultan Abdul-Medjid, is both a civil and a military reward. There are five classes in the order, and the decoration consists of a silver sun, with seven threefold rays, which alternate with the croscent

and the star.



Medjidich: Insignia of the First Class.

Mediar, or MESPILUS, a genus of trees belonging to the order Rosaceæ. The flowers are large and white, and have five-cleft calyxes and corollas, and these are followed by fleshy, top-shaped fruits. The common wild medlar (M. germanica) is a doubtful British native. The cultivated varieties have a curious crooked-ness in the branches. This habit, together with the spreading nature of the boughs, makes the medlar a pleasant shade tree. Medlars prefer fairly heavy soil, rather moist than dry, and a little shelter. The only pruning consists in an occasional trim-ming out of the branches. The medlar is either grown on its own roots-as in raising new varietics-or more commonly grafted on seedling medlar stock, or on the pear, quince, or whitethorn. Medlars should be picked at the end of October or early in November, and should be kept for three or four weeks before being eaten.



1, Flower, section-petals removed; 2, fruit.

Medmenham, par., Buckinghamshire, England, on Thames, 11½ m. N.W. of Windsor. Its Cistercian abbey dates from 1204. Here a mock order of Franciscans, founded by Sir Francis Dashwood, and known as the 'Hell Fire Club,' was established in the 18th century. Among its members was John Wilkes. In the parish are one or two ancient Danish encampments.

Médoc, old dist. of Guienne, France, situated on the W. shore of the estuary of the Gironde. It now forms part of dep. Gironde, and is famed for claret.

Medulla Oblongata. See Brain.

Meduliary Rays, in vegetable physiology, are the radiating cellular bands which, lying between the bundles of the vascular cylinder, connect the cellular tissue of the pith with that of the cortex.



Mcduttary Rays.
m, m, Medullary rays; p, pith.

Medusa, in ancient Greek legend, one of the Gorgons. Originally she was a beautiful maiden; but Athena changed her hair into serpents because she had by Poseidon conceived two sons in one of her temples. She then became so hideous that all who saw her were turned into stone. Perseus killed her, and cut off her head, which Athena placed in the centre of her shield.

Medusæ. See Jelly-Fish.
Medway, riv., England, rises partly in Sussex and partly in Surrey, and flows some 60 m. through Kent, mainly N.E., past Tonbridge, Maidstone, Rochester, Strood, and Chatham, beyond which it opens into an estuary 12 m. long. At Sheerness it enters the Thames between the islands of Grain and Sheppey. It is tidal and navigable to Maidstone, but large vessels cannot go beyond Rochester Bridge.

Meer, JAN VAN DER (1628-91), crroneously written Vermeer, Dutch painter, was born at Haarlem. He painted landscape and battle pieces, and his marine pietures are particularly good. His best landscapes are in the Berlin Museum, Brunswick and Dresden galleries, Munich, and the Louvre.—JAN VAN DER MEER, the younger (1656-1705), son of the above, painted landscapes with animals, and was very successful in depicting sheep.

Mecrane, tn., Saxony, Germany, 27 m. by rail w.n.w. of Chemnitz, has manufactures of woollen and mixed cloths, engineering, and boot and shoe making. Pop. (1901) 23,851.



Meerkat.

Meerkat, or Suricate (Suricata tetradactyla), a mongoose which appears to be peculiar to Cape Colony, where it is very abundant and is often kept as a domestic pet. It is a small, slender animal, with elongated nose and very long claws. The long and soft fur is grayish with black markings, the ears also being black. In the wild state the animals live in warrens, and appear to feed chiefly on bulbs.

Meerschaum, a white or yellowish earthy mineral, consisting of hydrous magnesium silicate. It is highly porous, and may float on water, though in a fine crushed powder it has a specific gravity over 2. It is very soft (h. = 2 - 2 b), and is easily turned into pipes and cigar-holders. Before use the meerschaum is impregnated with oil, tallow, or wax; after some time it becomes brown from the oils absorbed from the tobacco.

Meerschaum is obtained principally from Eski-shehr in Asia Minor, where it occurs in clays associated with weathered serpentine; also from Samos, Utah, and Moravia. The principal seat of the manufacture is Vienna, but pipes are also made in Paris.

Meerut, chief tn. in div. and dist. of same name, United Provinces, India, 40 m. N.E. of Delhi, and connected with it by rail. There is a large cantonment N. of the ancient city. Meerut was the scene of the outbreak of the mutiny in 1857. Pop. (1901) 118,129. The district has an area of 2,370 sq. m., and a population (1901) of 1,540,175.

Meetings, gatherings of persons formed for some specific purpose, and presided over by a chairman whose duties are to see that order is maintained and to keep discussion to the matter in hand. He names those who rise to address the meeting, and they direct their remarks to him. See Palgrave's The Chairman's Handbook (14th ed. 1903).

Megalichthys, a genus of large extinct fossil fishes, also known as Rhizodus. The original specimens were found in the Lower Carboniferous strata of Central Scotland, and were described by Agassiz and Hibbert. See Dean's Fishes, Living and Fossil.

Megalopolis, a city of Arcadia in ancient Greece, founded in 371 B.C. It became one of the chief cities of the Achaean League. Philopoemen and Polybius were natives. There are considerable remains of the ancient town. Its walls were 51 m. in circuit, and its theatre was the largest in Greece. Excavations have been carried on by the British school at Athens (1890-93). See Excavations at Megalopolis (1892).

Megalosaurus, a large fossil reptile the remains of which have been found in the Great Colite of Britain and France. It belongs to the group of dinosaurs. Its thigh-bone is over three feet long, while a fully grown specimen must have been about thirty feet long. It was carnivorous.

Megapodidæ. See Mound-BIRDS.

Megara, tn., anc. Greece, in Megaris, just N. of the isthmus of Corinth. In its citadel stood a famous palace like those of Mycenæ and Tiryns, Megara founded several important colonies-c.g. Byzantium and Chalcedon on the Bosporus, and Megara in Sicily. Quarrels with Corinth caused Megara to ally with Athens from 461 to 441 B.C.; then the Megarans revolted, and the consequent exclusion of their traders from ports under Athenian control was one of the causes of the Peloponnesian war.

Megasea, a group of largeleaved saxifrages which mostly bloom either in winter or very early in the spring, and are evergreen.

Megasthenes (3rd century B.C.), Greek historian, sent by Seleucus, king of Syria, to the court of Sandrocottus, or Chandragupta (316-292 B.C.), at Magadha, in the valley of the Ganges. He wrote Indice, a work on the history and geography of India. Editions of fragments by Schwanebeck (1846) and Müller (1848).

Megatherium, an extinct fossil edentate of large size, al-

Megiddo, or MEGGIDDO, anc. fortified city, in plain of Esdra-elon, Palestine, 19 m. s.s.e. of Nazareth. Solomon restored the fortifications (1 Kings 9:15), and Ahaziah is said to have died there (2 Kings 9:27). During Roman times it flourished as Legio.

Megohm. See Ohm. Megrim. See MIGRAINE. Megrims and Vertigo. Horses-Diseases.

Mehemet. See MOHAMMED. Méhul, ETIENNE NICOLAS (1763-1817), French musical composer, was born at Givet, Ardennes, and settled in Paris in



lied to the existing sloths and ant-eaters. Many fine skeletons of it have been obtained from the Argentine Republic, and from other parts of S. America. It was as large as an elephant, the full length of some specimens being over eighteen feet. Probably it fed on the leaves and branches of small trees.

Megerle, or Megerlin, Ulrich. See Abraham a Santa CLARA.

Meghna, or Megna, the deltaic estuary of the E. Ganges and the Brahmaputra. A tidal hore and occasional cyclonic storm waves make navigation dangerous.

1778. He wrote some twentyfour operas, several symphonics and cantatas, and many songse.g. Chant du Départ (words by Chénier), Chant de Victoire, Chant du Retour—very popular with the revolutionary soldiers. Among his best-known works are Euphrosine et Corradin (1790), L'Irato (1801), Joseph (1807), and La Journée aux Aventures (1816). See Life by Pougin (1889).

Melderich, tn., Rhine prov., Prussia, 10 m. w. of Essen, has iron and steel works. Pop. (1901) 33,690.

Meiktila, div., Upper Burma, s. of Mandalay, having an area of 10,854 sq. m., and including the districts of Meiktila, Kyaukse, Yamethin, and Myingyan. The district of Meiktila has an area of 2,178 sq. m., and consists of undulating plain. Cattle-raising and agriculture are the chief occupations. Cap. Meik-tila. Pop. (1901) of div. 994,432; of dist. 252,305; of tn. 6,192.

Meilhac, HENRI (1831-97), French dramatist, born in Paris began his career as a dramatist in 1855. For twenty years (from 1861 to 1881) he collaborated almost exclusively with Halévy, upwards of fifty pieces being the result. The best of Offenbach's music was inspired by their librettos. After this partnership was dissolved, Meilhac produced (usually with a collaborator) some five-and-twenty pieces. His work, as a rule, is brilliant if super-ficial, his chief mission being to amuse. He was elected to the French Academy in 1888. Many of his plays have been translated into English. His Théâtre appeared in 8 vols. (1900-2).

Meiningen, cap. of Saxe-Meiningen, Central Germany, on the r. bk. of Werra, 43 m. by rail N.w. of Coburg. It was the birthplace of Hahnemann, founder of homoopathy. Pop. (1900) 14,483. Meisenbach Process. See

PROCESS WORK.

Meissen, tn., Saxony, Germany, on I. bk. of Elbo, 14 m. by rail w.N.w. of Dresden, noted for manufacture of 'Dresden china,' introduced by Böttger and carried on from 1710 to 1863 in the 15thcentury castle, Albrechtsburg, and now in the royal porcelain factory at Triebischthal. Its cathedral dates from the 13th century, and is one of the finest Gothic structures in Germany, its spire being particularly fine. Kölln, on the Elbe, is now incorporated with Meissen. Pop. (1901) 20,124.

Meissonier, JEAN Louis ERNEST (1815-91), the most famous 'small master' of the modern French school of painting, was born at Lyons. He rivals the 17th century Dutchmen in breadth and vigour combined with delicate finish, though unequal to them in colour and truth of characterization. He is famous for his dramatic and costume genre, and for his military pieces of small size, remarkable for historic truth. There are sixteen ad-mirable examples of his work in the Wallace Collection, London, among others Napoleon I. and his Staff, Soldiers Gambling, and The Guard Room. See Meissonier, by V. C. O. Gréard (Eng. trans. 1897), and by Formentin (1901).

Meistersingers, or MEISTER-SÄNGER, German minstrels of the artisan class who formed themselves into guilds in order to revive the national minstrelsy.

which had fallen into decay on the decline of the courtly minne-. singers. Their subjects were chiefly moral or religious, and their poems were constructed according to strict and inflexible metrical rules. The meistersingers claimed to have been founded by Frauenlob during the 13th century, and were at the height of their reputation in the end of the 15th century and the early part of the 16th. Their principal representatives were Hans Rosenblüt, the armorial painter; Hans Folz, surgeon; and Hans Sachs (1494-1574), the cobbler of Nuremberg.

Mekinez, or MEQUINEZ, tn., Morocco, in a mountainous region, 34 m. w.s.w. of Fez, contains the summer residence of the sultan and the Mulai Ismael mosque, a royal burial-place much visited by pilgrims. Leather and earthenware are manufactured. Pop. (estimated) 60,000.

Meklong, seapt. at mouth of river of same name (often given as a branch of the Menam), Siam, on N. part of Gulf of Siam, 45 m. s.w. of Bangkok. Salt is extensively exported. Pop. 10,000.

Mekong, sometimes given as CAMBODIA R., the principal artery of Indo-China, 2,800 m. long, has its source in Tibet, and flows s. and s.E. through Szechuen and Yün-nan, then forms the boundary between the British Shan states and French territories. From Xieng-sen it flows with a winding course E. to Luang Prabang; thence s. for 2 degrees to Kieng kan, where it bends E. to 104° E., and then runs S. to Kratie (121° N.). Numerous rapids above Kratie hinder navigation. Below Kratic the Mekong bends sharply w., and at Pnompenh it receives the arm of the Tonle Sap, and then divides into two great arms, the upper one of which discharges into the China Sea by five mouths, while the lower reaches the sea by the Kua-Bassac estuary.

Mela, Pomponius, the first Latin writer on geography, probably lived during the reign of the Emperor Claudius (41-54 A.D.). He was a native of Spain. His work is entitled De Situ Orbis, and in it he describes the countries lying around the Meditor-ranean. Edition by Frick (Teub-ner Series, 1880); Eng. trans. by Golding (1585).

Melaleuca, a genus of Australasian evergreen shrubs and trees belonging to the order Myrtaceæ. They mostly require greenhouse temperature in Britain, and thrive in a light peaty soil.

Melampus, in ancient Greek legend, the first mortal who acquired prophetic powers. He understood the language of birds, and cured the daughters

of Proctus, king of Argos, of madness. He is said to have introduced the worship of Dio-

nysus into Greece.

Melancholia, a form of insanity in which the patient loses interest in his surroundings, and becomes morbidly self-absorbed. He may be pursued by fear of social or financial ruin, or of eter-nal wrath in the world to come. Such patients must be most carefully guarded, as they may seek to terminate their woes by suicide, or they may be convinced that another person's death is required at their hands. Fresh air, liberal diet, moderate exercise, and careful attention to the bodily functions are essential for a cure.

Melanchthon, Philip (1497-1560), German reformer, the scholar' among the band of early Protestants, born at Bretten in the Palatinato. At Tu-bingen he began lecturing on the Aristotelian philosophy, also upon the Greek poets, publishing at the same time a grammar of that language. Elected professor of Greek at Wittenberg, he there met Luther, whose influence was all-potent, in a spiritual sense, on his life. His true name was Philip Schwarzerd ('black carth'), but by Luther's advice he adopted the Greek form of his patronymic. He now threw himself heart and soul into the work of the reformation. His pen drew up the Augsburg Confession, and he managed with conspicuous skill the conferences with the Romanist delegates at Worms and Ratisbon. After Luther's death, by common consent he became leader of the Lutherans. His most popular publication was Loci Communes Rerum Theologicarum (1521). See Lives by Schaff (1887), Theologicarum Hartfelder (1889), Richard (1898), and Ellinger (1902).

Melanesia, that section of the Oceanic world which extends from about 145° E. and 1° S. in a Capricorn at 180° E., and comprises in their order, from N. to s., the Admiralty Is., the New Ireland, New Britain, and Duke of York group (lately renamed the Bismarck Archipelago by the Germans); the Solomon, Santa Cruz, and New Hebrides archipelagoes; the Loyalty group, and New Caledonia, together with the outlying Fiji Is. For details, see the several entries. inhabitants differ in a marked degree from all the other Pacific islanders by their generally dark complexion, but vary greatly owing to the mingling in divers proportions of an intruding Polynesian element with the aboriginal black substratum. This substratum, however, is everywhere dominant, and is marked,



A Picture by Meissonier—'Hait at an Inn.' From the Waliace Collection.
iPhoto by Nanjatempl.)

besides by the colour, by a frizzly or almost woolly black hair, negroid features, very long and Melba, Madame (1865), Australian singer and prima donna (Helen Porter Armstrong), per-



Melanesia.

high (hypsistenocephalic) head, with cephalic index as low as 68° or 70°, and low stature, averaging about 5 ft. 4 in. The Melanesians are fierce and treacherous savages, pronounced headhunters and cannibals, like the Papuans of New Guinea, like with whom they are to be ethnically affiliated. But the languages differ. The Melanesians all speak archaic forms of the Malayo - Polynesian linguistic family. They would seem, at a very remote period, to have come under the influence of the more civilized Polynesians, who imposed their speech on them, while becoming largely assimilated in physical type to the conquered aborigines. This view would account for most of the present relations, which otherwise present an apparently inexplicable antagonism between racial and mental characters. See H. C. von der Gabelentz's Die Melanesische Sprache (1873); R. H. Codrington's The Melanesians (1891); F. H. H. Guillemard's Australasia (Stanford Series, 1891), vol. ii.; C. Ribbe's Die Salomo-Inseln (1903); and H. Schnee's Bilder aus der Südsee (1904).

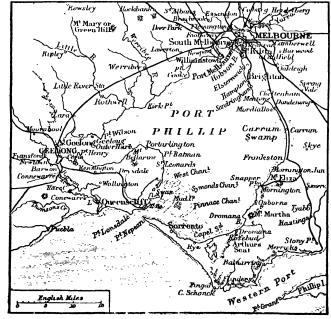
Melanuric Fever. BLACKWATER FEVER.

Melastoma, a genus of tropical evergreen shrubs belonging to the order Melastomaceae. Many of the species bear showy flowers, and a few are occasionally cultivated as stove plants. They like a light peaty soil, plenty of moisture in summer, and a fairly dry atmosphere in winter.

formed publicly in Melbourne at In 1886 she appeared in six. London, but with no marked

at Covent Garden in 1888 in Lucia diLammermoor, and scored a great success in Romeo and Juliet.

Melbourne, tn., Bourke co., Victoria, Australia, on the Yarra Yarra, at the head of Port Phillip Bay. It is the capital of Victoria, and the see of an Anglican bishop and of a Roman Catholic arch-Greater Melbourne inbishop. cludes the area within 10 m. of the general post-office, and contains the municipal districts of Melbourne, N. Melbourne, Fitzroy, Collingwood, Richmond, Brunswick, Northcote, Prahran, S. Melbourne, Port Melbourne, St. Kilda, Brighton, Essendon, Flemington and Kensington, Hawthorn, Kew, Footscray, and Williamstown. Melbourne is well laid out with broad streets, and contains magnificent buildings, such as Government House, two cathedrals, the government offices, Houses of Parliament, law and the university. The such as Government House, the city is fortunate in its parks and public gardens, such as the Botanical Gardens, Studley, Royal, Fawkner, Fitzroy, Carlton, Treasury, and Flagstaff Gardens. The port of Melbourne is 21 m. from the centre of the city, but vessels of considerable size can come up by the Yarra R., shortened by a canal. At Williamstown there



Melbourne and Port Phillip.

success; after more study, however, she took Brussels (1887) and Paris (1889) by storm. She sang

are a graving dock and patent slip; on the Yarra are a dry and a wet dock. In 1904 the total ex-

ports were valued at £24,404,917. and the imports (including interstate trade) at £20,091,951. Melbourne was first settled in 1835, incorporated on Aug. 12, 1842, and created an episcopal see on Aug. 3, 1849. Pop. of greater Melbourne (1901) 493,956.



Madame Melba. (Photo by Reutlinger.)

Melbourne, WILLIAM LAMB, VISCOUNT (1779-1848), English statesman, was born in London, and entered the House of Commons in 1805 as a follower of Fox; but the genius of Canning s duced him for a time from his Whig principles, and in 1827 he became Irish Secretary under that statesman. By the death of his father he was elevated to the House of Lords in 1828, and there returned to his Whig principles. In 1830 he was Home Secretary under Earl Grey, and succeeded him as first minister in 1834. His first tenure of office was short, but he returned to power in 1835, and remained in office till 1841. He is remembered chiefly for his kindly devotion to the young queen Victoria. See Life, by Dunckley (1890), and Lord Mel-bourne's Papers, by L. C. Sanders (1889).

Melbye, Daniel Hermann Anton (1818-75), Danish marine painter, born at Copenhagen; went to Rome (1843), and to Constantinople, where the Sultan employed him. His best pictures are The Eddystone and The Sea Fight in Copenhagen; and Le Fight, in Copenhagen; and Le Forfait, in Stockholm.

Melchites, a name first given to the Egyptian orthodox Christians in the 4th century, now denoting the Christians of Syria, Palestine, and Egypt, who employ the Greek rites, but hold the doctrines and acknowledge the supremacy of the Church of Rome. They number 80,000, and

are ruled by the patriarch of Damascus and twelve bishops.

Melchizedek, according to Gen. 14, king of Salem and priest of the most high God. He gave a blessing to and received tithes from Abraham while the latter was returning from his victory over Chedorlaomer. Melchizedek is referred to in Ps. 110 and Heb. 6:20, 7:1 #. as a type of Christ. In a cuneiform letter found at Tell-el-Amarna, sent by the king of Uru-Salem to the king of Egypt, the writer describes himself in language approximating to Heb. 7:3, 'without father or mother; but the criticism of Gen. 14 is as yet altogether uncertain.

Melcombe Regis and Weymouth. See WEYMOUTH.

Meldola, RAPHAEL (1849), English chemist, was born in Islington. In 1875 he was put in charge of a Royal Society eclipse expedition, and in 1885 was elected professor of chemistry in the Finsbury Technical College, London. He has greatly advanced the chemistry of photography and the teaching of chemistry and chemical technology; he has also helped in the development of the theory of evolution, and laboured as a field naturalist. He has published The Chemistry of Photography (1889); Coal, and what we get from it (1891); a translation of Weismann's Studies in the Theory of Descent (1880); and The Chemi-cal Synthesis of Vital Products (1904).

Meleager, in ancient Greek legend, king of Calydon in Ætolia. He shared in the Argonautic expedition, and afterwards, when the boar was slain that ravaged the territory of Calydon, Meleager gave its skin to Atalanta. At this his mother Althæa's brothers were enraged, and he slew them. Thereupon Althan cursed her son, or burned a mystic firebrand, which caused his death. See Świnburne's Atalanta in Calydon (1865).

Meleager, a native of Gadara in Palestine, who lived about 60 B.C.; was a writer and collector of Greek epigrams, mostly on love. One hundred and thirty-one of them are included in the

Greek anthology.

Meleda (anc. Melita), isl. (23) m. by 4 m.), Dalmatia, Austria, in the Adriatic, 17 m. w.n.w. of Ragusa. Pop. 1,617.

Melegnano, tn., Milan prov., Lombardy, Italy, 11 m. by rail S.E. of Milan; has manufactures of silk and linen. Here, on Sept. 13-14, 1515, Francis I. of France defeated the Swiss and Milanese; and on June 8, 1859, the French defeated the Austrians. Pop. (1901) 6,782.

Melendez Valdés, Juan (1754-1817), Spanish poet, born at Ribera del Fresno in Badajos. He

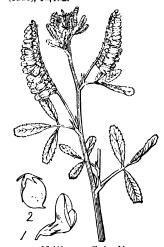
lived for many years as professor of law at Salamanca. A friend and follower of Jovellanos, he was a sweet pastoral poet, but a man of small stability, who tried most things, yet failed in all except poetry. He embraced the French side in the invasion of his country, and died in exile at Montpellier. His best poems are the eclogue Batilo; odes, To the Arts, To the Presence of God, The Apparent Prosperity of the Wicked; and elegies, Parting, and The Likeness, His Poesias were published in 1785. See a monograph by Mérimée (1894).

Melfi (anc. Aufidus), walled tn., Potenza prov., Italy, 33 m. s. of Foggia, was founded by the Romans in 304, and made the Norman capital of Apulia in 1041. It has the ruins of a castle and a Norman cathedral (12th century). Grain, vines, and olives are cultivated. Pop. (1901) 14,547.

Melia, a genus of tropical trees belonging to the order Meliaceæ. They bear large axillary panicles of white or purple flowers, followed by small drupes. Most lowed by small drupes. of the species require the protection of glass in Britain.

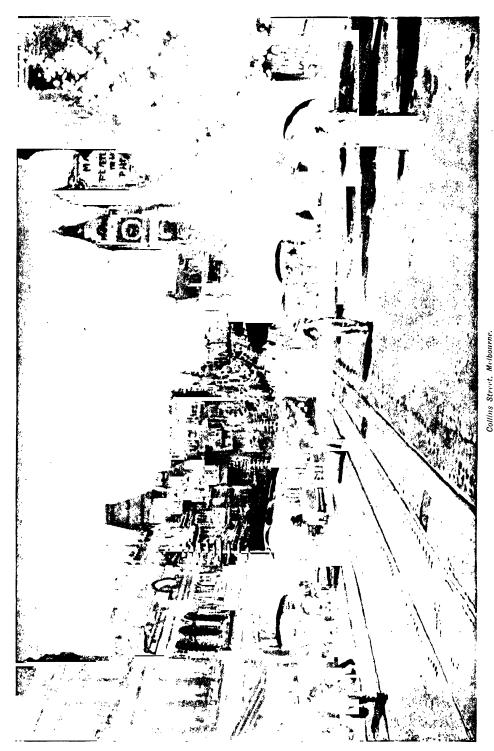
Melianthus, a genus of South African shrubs belonging to the order Sapindaces. They bear racemes of often sweetly-scented flowers, and many of the species are cultivated as nearly hardy plants in Britain.

Melilla, fort. seapt. and Spanish convict settlement on N. coast of Morocco, en E. side of peninsula ending it Cape Tres Forcas. Pop., including garrison (1900), 10,182.

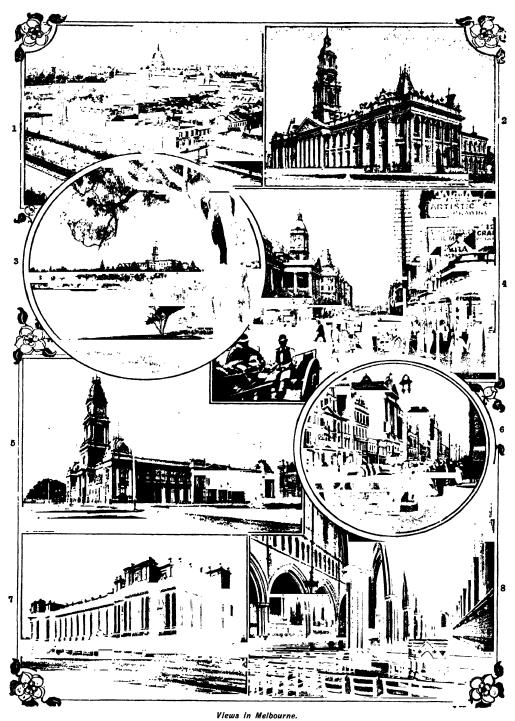


Melilotus officinalis. 1, Flower; 2, fruit.

Melilotus, a genus of leguminous herbaceous plants, with trifoliate leaves and loose ra-



Melbourne, the capital of Victoria, Australia, is well laid out with broad streets, and contains many magnificent buildings, such as Government House, House, or Parliament, law courts, maversity, town hall, and St. Patrick's Carbodral. The city is also bottunde in its parks and public gardens. Melbourne was first settled in 1855, and has grown with remarkable rapidity. In 1841 its population was 11,000, in 1864 it amounted to 495,956.



General view from the Fire Station.
 Town Hall.
 Melbourne.
 Government House and Botanical Gardens.
 Swanston Street and Town Hall.
 Collingwood Town Hall.
 Colling Street.
 Parliament House.
 St. Paul's Cathedral, south aisle and nave.
 Photos.
 St. Paul's Cathedral, south aisle and nave.

cemes of yellow or white flowers, the petals of which soon fall off. A fairly common British species is the yellow melilot (M. officinatis), which grows to about three feet high, and bears in late summer small yellow flowers. The plant, when dying, yields a scent not unlike that of new hav.

not unlike that of new hay.

Méline, FÉLIX JULES (1838), French statesman, was born at Rémirement in the Vosges; became an advocate in Paris. He has been regularly elected to the National Assembly since 1872, and became minister of agriculture (1883 5). In 1889 93 he was the leader of the parliamentary group who demanded a protectionist tariff, and is mainly responsible for the tariffs of 1892. He was premier (1896-8) when the movement for a revision of the Dreyfus trial was agitateda movement to which he was opposed. He was the unsuccessful candidate against Loubet for the presidency. He has published Le Retour à la Terre et la Surpro-duction (1905).

Melinite, a high explosive, used in the French military service as a bursting-charge for shells. The exact process of its manufacture has not been made public, but the composition is known to be a form of pieric acid, differing little, if at all, from lyddite.

Meliphagidæ. See Honey-

EATERS.

Melissic Acid, C₂₉H₅₉COOH, is a fatty acid occurring in beeswax, and prepared by heating myricyl alcohol with caustic potash. It is a waxy crystalline solid (m.p. 91° C.) that is soluble in alcohol.

Melita. See Malta.

Melitopol, tn., Taurida gov., S. Russia, on N.E. of the Crimean peninsula. Pop. (1897) 15,120.

Melittis, a genus of labiate plants, of which the only known species is a native of Britain. M. Melissophyllum, the bastard palm, is a handsome herbaceous perennial, with long, crenated, opposite leaves and pink-spotted, cream-coloured flowers. It blooms

in late spring.

Mellin, (1957AF HENRIK (1803-76), Swedish author, was born at Revolax in Finland. His historical novels Blomman på Kinnekulle, Sivard Kruses bröllop (1830), and Anna Rethnitz (1831)—were received with great favour. From 1831 to 1845 he published annually a collection of poems and novels, entitled Vinterblommor. As a popular historian he also made his murk with Fäderneslandets Historia för Fruntimmer (1836). His biographical work, Sveriges store Män och Märkvärdigaste Fruntimmer (1840-9), is also very interesting.

Melo. See CERRO LARGO.

Melocactus, a genus of tropical cacti with globular, unbranched, ribbed, succulent stems, the ribs of which are surmounted by clusters of spines. On the summit of the stem is a smaller and cylindrical body, known as the cap, and on this the little red flowers are borne. These plants are not easy of culture. They require dry, well-drained soil and a high temperature. They are mostly natives of S. America.

Melodrama originally signified a play interspersed with vocal and instrumental music. The term was first applied by the Italians to what we call opera. In the course of time the vocal introductions became fewer and fewer, until they were dispensed with altogether, and instrumental music alone was used to emphasize the action. two earliest melodramas in the English language, A Tale of Mystery (1802) and Deaf and Drumb (1801), were written by Thomas Holcroft. Melodrama, comprising strong situations, and resembling both the domestic and the sensational drama, with poetic justice fulfilled at the end, is still one of the most popular forms of dramatic entertainment. It flourishes in London, at Drury Lane, at the Princess's, at the Adelphi, and did at the Lyceum, where Sir Henry Irving produced two notable examples in The Lyons Mail and The Bells.



1, Section male flower; 2, section female flower; 3, fruit.

Melon (Cucumis melo), the most valuable of the fruits yielded by the tribe of gourds. In Britain melons can rarely be grown satisfactorily without the help of frames or glass houses. The soil should be made very firm before planting. Melons require abundance of water at the roots, and frequent syringing of the leaves

during the period of active growth. The seeds should be sown every two or three weeks from February to July for a succession. should be placed one seed to a pot containing two parts fibrous loam and one part leaf-mould. The pots should be kept in a frame with a bottom heat of from 75° to 80°. Plenty of light should be afforded to the plants at every stage of their growth. One plant in each light is usually enough. As soon as the third rough leaf appears, the points should be pinched out; and when the two branches which issue from the axils of the lower leaves reach the front and back of the frame, the points should again be pinched out, and all the side shoots should subsequently be pinched off at one leaf beyond the fruit. Only one fruit should be allowed to each lateral. Setting the fruit should, especially in the earlier months, be assisted by means of a camel-hair brush. As soon as the fruit begins to swell, a piece of slate should be placed under it to keep it from getting soiled. When near the ripening stage, the fruit should be cut and placed in a cool room for a day or two before being eaten. The temperature of the pit during the spring months should be from 60° to 65° by night, and from 70° to 80° by day. Give air in mild sunny weather. Close the frames about 3 or 4 p.m. Flavour, size, productiveness, and thinness of skin are perhaps the points to aim at.

Meloria, isl. about 4 m. outside the harbour of Leghonn, Italy, where the naval power of Pisa was destroyed by Genoa in 1284.

Melos. See MILO.

Melpomene, the tragic muse. See Muses.

(I.) Town, Rox-Melrose. burghshire, Scotland, on r. bk. of Tweed, at the base of the triple Eildon Hills, 37 m. s. of Edin-burgh; centre of the district associated with Sir Walter Scott Abbotsford, Melrose Abbey, Dryburgh Abbey, and locality of The Monastery — great tourist resort. The abbey, founded by David I, in 1136, became the chief Scottish house of the Cistercians. Destroyed by Edward II. in 1322, rebuilt in 1326 through the liberality of Robert Bruce, partly burnt by Richard II. in 1385, it was wrecked (1545) in Lord Here-ford's expedition. The architectural features are well described in Scott's Lay of the Last Minstrel. canto ii. It contains the grave of Michael Scott the wizard, and of King Alexander II., and here the heart of Robert the Bruce is buried. Old Melrose, on a promontory 3 m. E., is the site of the ancient monastery established by St. Aidan about 640, and of which

St. Cuthbert was at one time prior. It was descreted in 1075, and no traces of the building now remain. Across the Tweed, opposite to Molrose, is Gattonside, a pleasantly situated village and summer resort, for many years the residence of Sir David Brewster. Darnick, half a mile w., has an old Border peel. A mile S.E. is the Elidon tree, under which Thomas the Rhymer met the queen of the fairies. Pop. (1901) 2,195. See Bower's Abbeys of Melrose and Old Metrose (1813); Libre S. Marie de Metros (1813); Libre S. Marie de Metros (1879); Skene's Celtic Scotland; and Macgibbon and Ross's Lectes.

depresses the melting-point of a substance to an extent that, provided the impurity is present only in small amounts, is in proportion to the number of molecules of the admixed substance, and hence a determination of the meltingpoint is a valuable method, not only of testing the purity of a substance, but also of determining the molecular weight of another stuff that may be mixed with it. Conversely, by observing what substances melt under specified conditions, a measure of the temperature of the place is afforded; and though the method, which was fully elaborated by Carnelly, has to some extent lost its importance as a means of determining high

not be melted at pressures slightly below that of the atmosphere, it melts if heated at pressures slightly above it. Melting-points of substances that melt within moderate limits of temperature are determined by a number of methods; one of the commonest is to fill a thin-walled tube of about the thickness of a knitting-needle with the stuff, strap it to a mercurial thermometer, and immerse both in a well-stirred bath of water, sulphuric acid, air, etc., that is heated till melting takes place. An observation of the freezing-point may be made as the bath cools again, but may lead to serious error, as a substance often considerably 'over



Melrose Abbey.

Photo by Frith.

Architecture of Scotland. (2.) City, Middlesex co., Massachusetts, U.S.A., 7 m. N. of Boston, of which it is a suburb. Pop. (1900) 12,952.

Melting is the change of physical state that takes place when a solid becomes a liquid under the influence of heat, and indicates an increase of molecular mobility. For any given substance that can be sufficiently heated without undergoing chemical decomposition, the temperature at which it occurs is a fixed one, and the change takes place sharply; an intermediate pasty stage indicates decomposition, or a mixture some of the components of which are more fusible than the rest. The presence of impurities

temperatures, owing to the introduction of other processes, yet it is still of great value in calibrating thermometers. Melting-points are but little affected by pressure; very great pressures, however, slightly lower the temperature of fusion of substances that solidify with expansion, and conversely. Thus, an increase of pressure of 1,000 atmospheres lowers the melting-point of ice 7'2° C., and raises that of paraffin wax 30° c. In those cases where a substance sublimes-i.e. vaporizes before it melts-the melting-point can be determined by raising the pressure, which, while hardly affecting the melting temperature, greatly raises the temperature of volatilization. Thus, while iodine can-

cools' before the change takes place. If, however, the thermometer can be immersed in a quantity of the cooling liquid, the determination of the freezing temperature gives accurate results; for even though over-cooling does take place, yet, when-ever solidification happens, the temperature rises at once to the true melting-point. Determinatemperature is much more difficult to carry out. Air thermometers, platinum - resistance thermometers, or thermo-junctions, are immersed in, or placed near, the substances; but the results obtained by different observers with different methods often show wide discrepancies.

Besides its application to determine temperature, purity, and so forth, melting is employed commercially to separate components of different fusibility, and to take copies of objects by moulding and casting, substances that expand on solidification giving the sharpest castings. Melting for such purposes is carried out in steam-jacketed pans. crucibles, blast or reverberatory furnaces, according to the nature of the material. See also IRON-FOUNDING, PYROMETER, SUPERCOOLING.

Melton Mowbray, tn., Leicestershire, England, 15 m. N.E. of Leicester. The church of St. Mary is a handsome cruciform structure, with chained books. Melton is a hunting centre, and is noted for pork pies. Pop. is noted for pork pies. (1901) 7,454.

Melun (anc. Melodunum), cap., dep. Seine-et-Marne, France, on the Seine, 28 m. by rail s.s.E. of Paris; has the rums of a royal palace. Taken by Henry v. in 1420, it remained in the possession of England till 1430. Jacques Amyot, the French writer, was a Woollen, linen, and cotnative. ton goods, leather, and pottery are manufactured. Pop. (1901) 13,059.

Melusina figures in French legend as a beautiful woman whom Raymond, youngest son of the Count de la Forêt in Poitou, encountered beside a woodland fountain and after-wards wedded. Before agreeing to marry him, she stipulated that every Saturday she should be allowed to retire into complete seclusion. By her art she erected for him a splendid castle, known as Lusignan, which gave to Raymond and his heirs the title of Comtes de Lusignan. One Saturday her husband broke the tabu, and sought her in her retirement. She was bathing, and to his horror he discovered that the lower half of her body had become that of a fish or a scaly dragon. Melusina continued to haunt the castle ramparts for centuries afterwards, always appearing before the death of its counts. The story is one of many variants of an ancient legend. See Baring-Gould's Curious Myths of the Middle Aues (1888).

Melville, or Melvine, Andrew (1545-1622), Scottish churchman, was born in Baldovie, Forfarshire. After studying at Paris (1564-6) and at Poitiers (1566-8). he was professor of humanity in Geneva Academy (1568-74). Returning to Scotland in the latter year, he was chosen principal of Glasgow University. In 1577 he was appointed to the charge of Govan. Taking an energetic part in ecclesiastical discussions, he latterly occupied in the church a position of unique authority, like that previously held by Knox. His ecclesiastical policy was largely influenced by his connection with Geneva. But he lacked both the genius and the practical shrewdness of his predecessor; and while he greatly excelled him as a scholar, his occlesiastical outlook was narrower and more intensely Presbyterian. In 1584 he was forced, on account of some rash expressions in a sermon, to leave Scotland, but returned after the fall of Arran (1585). In 1590 he became rector of St. Andrews University; but he was deprived of that office in 1597. After the accession of James VI. to the English throne he became involved in the dispute regarding an illegal meeting of the Assembly at Aberdeen in 1605, and being summoned to London, conducted himself so obstreperously that in April 1607 he was sent to the Tower, and in June deprived of the principalship of St. Mary's College. After his release he went to France, and was appointed to the chair of Biblical theology in Sedan. where he died. Melville wrote excellent Latin verses. See Life by M'Crie (1819).

Melville, G. J. WHYTE-. See WHYTE-MELVILLE.

Melville, George Wallace (1841), engineer-in-chief to the United States navy; entered the navy (1861), became chief engineer (1881), engineer-in-chief (1887), and was reappointed (1892) and 1896). He saw active service during the war of secession, joined the *Jeannette* expedition (1879), and led a search expedition for the missing crews. He was also a member of the Greely Relief Expedition (1884). He published In the Lena Delta (1885).

Melville, HERMAN (1819-91), American author, born in New York city, ran off to sea in 1837, and was imprisoned by the natives of the Marquesas Is. Returning to Boston (1844), he published Typee (1846), tales of his adventures, and Omoo (1847). He subsequently wrote White Jacket (1850), Moby Dick (1857), Voyage round the World (1860), and the poems Clarel (1876) and Timoleon (1891). He held a position in the American Customs from

1866 to 1885. Melville, JAMES (1556-1614), Scottish reformer, was born near Montrose. Under his uncle he was elected one of the regents of Glasgow University in 1575, and after the translation of his uncle to St. Andrews he became there professor of Hebrew and Oriental languages. He had to follow his uncle into exile in 1584, but returned with him in 1585, and in 1586 was appointed to the charge of Anstruther, reduced in 1590 to that of Anstruther Easter and

Kilrenny. He supported the ecclesiastical policy of his brother. Being in London when his brother was imprisoned in the Tower, he was not permitted to pro-ceed farther north than Newcastle-on-Tyne, where he died. He is mainly remembered for his Diary · (Bannatyne Club, 1829;

Wodrow Society, 1842).

Melville, Sir James, of Hal-hill (1535-1617), Scottish diplomatist. He was page to Mary Stuart at the court of France. Mary on her return to Scotland employed him in diplomatic missions, appointing him also a member of the Privy Council. His tact and circumspection were conspicuous in his dealings with Elizabeth; and after Mary's imprisonment he was still employed by the Scottish government, until the closing year of Morton's re-gency. He left Memoirs (1683; best ed., Bannatyne Club, 1825). Melville, Viscount. See

DUNDAS. Melzi, Francesco, Count (1491-1568), Italian painter, pupil and friend of Leonardo da Vinci. Vertumnus and Pomona, in Berlin, is generally regarded as his. He followed Leonardo to France, attended him in his last illness, and inherited all his instruments. drawings, MSS., and books.

Members of Parliament. See

PARLIAMENT.

Membrane, a texture of the animal body which covers organs, lines the interior of cavities, and enters into the formation of walls of canals and tubes. Bichat recognized three kinds of membranes -- mucous, serous, and fibrous. Mucous membranes consist of epithelial cells (see EPI-THELIUM), usually arranged in layers, and resting on a sub-epithelial layer of fine fibrous connective tissue, in which ramify the nerves and lymph and bloodvessels. Serous membranes usually present one layer of scalelike endothelial cells on a subendothelial layer of connective tissue. Fibrous membranes are composed of fibrous connective tissue arranged in more or less parallel threads, with connective tissue corpuscles between. Membranous bones are those which are formed by the ossification of membranes. The deciduous membranes are the coverings of the ovum in utero. Their origin is partly feetal and partly maternal. After the birth of the child they are shed from the uterine surface. and with the placenta form the afterbirth. It is part of these membranes which sometimes covers the child's head at birth and forms a caul.

Memel. (1.) Seaport tn., prov. E. Prussia, Prussia, at N. extremity of Kurisches Haff, 70 m. N.E. of Danzig. It has an excellent harbour, is a centre of the Baltic trade in timber, and exports corn, hemp, flax, linseed, pitch, and tar. Total exports (1905) £1,668,450; imports, £1,429,090. The town manufactures brandy, soap, cellulose, chemicals, and there are sawmills, iron foundries, breweries, and shipbuilding yards. Memel was founded in 1252 by the Livonian order, who gave it to the Teutonic Knights. In 1807 a treaty was signed here between Great Britain and Prussia. Pop. (1900) 20,166. (2.) Or NIEMEN, riv. of Europe, rising in Russian gov. of Minsk, flowing generally w. to Grodno, then N. and W., and entering the Kurisches Haff (E. Prussia) by two arms.

Memlinc, Memling, or Hemling, Hans (c. 1430-94), Flemish painter, was born at Mainz on the Rhine, but settled in Bruges before 1479. He ranks among the purists of Flanders, and used the oil methods of the Van Eyeks. A dreamer and idealist, he created an ideal feminine type unknown before his time. He used pure, bright colours. His best work is in St. John's Hospital at Bruges, including his lovely Shrine of St. Ursula. There are good examples of his work in Turin, and in the National Gallery, London. See W. H. J. Weale's Hans Memline (1901).

Memmi, Lippo (14th century), Italian painter, belonged to the Siena school, and painted between 1332 and 1351; was a good colourist and a fair draughtsman. He frequently worked with Simone Martini. His independent works include Scenes from the Life of Christ, and a panel picture of the Virgin and Child, regarded as his best painting.

Memmingen, tn., Bavaria, Germany, near river Iller, 33 m. s.E. of Ulm. It figured conspicuously in the religious wars of the 16th century. Here, in 1800. Moreau defeated the Austrians. It manufactures linen, leather, and soap. Pop. (1903) 10.889.

Memnon, in ancient Greek legend, helped the Trojans against the Greeks after Hector's death; he killed Nestor's son, Antilochus, but was himself killed by Achilles. Later writers represent him as an Ethiopian or a Persian. The Greeks gave the name of Memnon to a colossal statue at Thebes in Egypt, which was really that of a king Amenophis; it gave forth a musical sound at dawn.

Memoirs. See Biography. Memorandum of Association. See Company.

Memory, sometimes used as equivalent to mental retentiveness in general, is, as a rule, now used in the more limited sense of the 'mental revival of conscious experience' (Baldwin). There is, however, much to be said for including revival of sensations, and so forth, not at the time of perception attended to consciously, but still capable of emerging into consciousness, given the necessary stimulus or absence of inhibitory agencies. The phenomena of crystal-gazing, where sensations are objectified that were not consciously perceived, are probably reproductions of impressions so fugitive as not to be attended to at the time of perception. Similarly, dispositions determining the order of revival, or the kind of images or concepts most easily revived, may be gradually and unconsciously acquired, and yet are properly named memory. Many of the phenomena of hypnotism consist of subconscious dispositions. Automatic actions may at first be conscious and ultimately become unconscious, yet form the basis of special memories-e.g. writing and speaking. Psychologically, a full act of memory involves retention or fixation, reproduction (active or passive), recognition, and localization in past time. The power of retention is a primitive endowment of the nervous system, and varies greatly in individuals. Probably the power is for each person a limited quantity. It may be increased by increased attention to the original experience that is to be remembered, or by improved system in acquisition. As a rule, each individual has certain special interests, and the topics related to these are more readily attended to, and therefore more readily retained, being supported, too, by the greater number of experiences of the same or related kinds. Systems of mnemonics may increase the apparent retentiveness; and this is, as a rule, secured by systematizing the forming of associations between mental acquisitions not obviously related. The power of retention varies at different periods of life, being greatest in early youth as far as mere meaningless retention goes; great also in middle life, on account of greater systematization of experiences; gradually fading towards later life, until at last it almost ceases for recent experiences. The power of reproduction also varies greatly, and is affected by much the same conditions. The practical uses of memory depend largely on the facility of reproduction. Reproduction may be passive, as in reverie, where images of past events float back into the mind involuntarily; or active, where voluntary effort is made to set going trains of association related to the event to be remembered. Individuals vary greatly in their powers of ready recall.

The dispositions formed by experience in the nervous system are capable of stimulus from within the brain or from without. All the nerve tissues have the capacity to acquire such dispositions. physical problem of memory, therefore, is neither more nor less than the physical problem of the original impression or perception -- the nervous impression being accompanied by consciousness at the time of perception, and the memory being accompanied by similar consciousness at the time of revival along the same nerve tracts. By memory there is thus formed a physical record of experiences -a microcosm of the environmental macrocosm. The revival of nerve energies along the path of the original impressions is the physical concomitant of memory. The older conception of 'unconscious mental modifications' and storing of images was based on a less thorough-going theory of psychophysical concomitance. Ribot has elaborated the theory of memory from the biological standpoint, and has shown by positive induction that, in cases of general dissolution of memory, the loss of recollections follows an invariable path -recent events, ideas in general, feelings, and acts. In partial dissolution the sequence of loss is -proper names, common nouns, adjectives and verbs, interjections, gestures. The same law holds of the physical mechanism of memory. See Bain's Senses and Intellect (1894); Baldwin's Elements of Psychology (1891); Stout's Manual of oyy (1831); Stouts Manual of Psychology (1899); Spencer's Psychology (1890); Ribot's Dis-cases of Memory (1890); Kay's Memory (1891); Ward's article 'Psychology' in the 9th ed. of

Encyc. Brit. Memphis. (1.) Ancient capital of Egypt, 12 m. s. of Cairo, on l. bk. of Nile (29° 51' N.). It was founded by Menes, the first king of the first dynasty, and was called by him Men-nefer, which the Greeks corrupted into Memphis. The great temple of Ptah is said to have been built by Menes. Other famous buildings were the Scrapeum, the temple of Isis, and a temple of Ra. Here, too, are the pyramids. Memphis suffered greatly at the hands of the Persians, but in Strabo's time was still very grand. After the building of Cairo it began to decline, and it formed the quarry for some of the Cairene palaces. By the commencement of the 19th century nearly all traces of it had disappeared. (2.) City, Shelby co., Tennessee, U.S.A., on E. bk. of Mississippi, an important railway centre, with a large river commerce. It is a centre of the cotton trade. The chief products

are lumber, oil, cotton seed and cake, foundry and machine-shop products. Here, in 1862, a Con-tederate fleet was defeated by a Federal fleet under Davis. Pop.

(1900) 102,320.

Mena, JUAN DE (1411-56), Spanish poet, born at Cordova. Having at Rome fallen in love with Italian culture, on his return to Spain he joined the Italianate school of Santillana. He was a favourite poet, historian, and courtier of the literary king Juan 11. Though his poetry retained the old Spanish form, the matter and ideas were saturated with Dante's influence. His great work is El Laberinto (also Las Trescientas), a pompous didactic allegory, containing isolated passages of great dignity and beauty. Collected editions have been published by Nunez (1552) and by Sanchez (1804).

Menabrea, Luigi Frederico,

It is crossed by the Britannia Railway (tubular) bridge, con-structed by Robert Stephenson (1850), 1,380 ft. long, and 100 ft. above high-water mark; and by a suspension bridge, constructed by Telford (1819-25), 1,710 ft. in length, and the same height above the water.

Menam, riv., Siam, rises in 19'35' N. and 101° 20' E., and flows mainly s., receiving the Me-Ping, which drains the W. Shan states. Beyond Chainat the river divides into several branches, the most westerly of which is the Taching, and falls into the Gulf of Siam after a course of some 900 m. Bangkok stands 25 m. from the mouth, but a bar 5 m. from the gulf prevents ships of more than 13 ft. draught from ascending to the town. It is the great Siamese highway of trade.

Menander (342 291 B.C.), poet of the New Comedy at Athens.

Ménant, Joachim (1820-99). French jurist and Assyriologist was born at Cherbourg, and held various judicial appointments. Together with Oppert he introduced into France the study of Assyriology, and delivered the first lectures on the subject at the Sorbonne in Paris in 1869. He was a voluminous author of Assyrian text-books and works on epigraphy and grammar; also of Annales des Rois d'Assyrie (1874) and Ninive et Babylone (1887).

Menasha, tn., Winnebago co., Wisconsin, U.S.A., at mouth of the Fox R., in Winnebago Lake, 88 m. N.W. of Milwaukee; has manufactures of lumber products, paper and woollen goods. Pop.

(1900) 5,589.

Mencius, Latinized form of Mêng-Tse (372 288 B.C.), Chinese sage, born in Shantung; became, when about forty, minister under Prince Hsüan of the Ch'i state;



Statue of Rameses at Memphis.

MARQUIS DE VALDORA (1809-96), Italian statesman and general, born at Chambéry; became professor of mechanics and construction, and member of the Academy of Sciences (1839). He became minister of marine (1861), min-ister for foreign affairs (1869), president of the council (1867), and ambassador to London (1876-82) and Paris (1882-92).

Menage, GILES (1613-92), French writer, born at Angers; entered the church, and obtained the deanery of St. Peter at Angers. He published Origines de la Langue Française (1650); Dictionnaire Etymologique (1650); Origini della Lingua Italiana (1669); Observations sur la Langue Française (1672-6). See Baret's Life (1859) and Samfiresco's (1902), both in French.

Menai Strait, between the island of Anglesey and the mainland of N. Wales, about 13 m. long, with extreme width of 2 m.

Alexis, the comic peet, was his uncle; the philosopher Epicurus and Theophrastus were among his intimate friends. He is said to have been drowned while swimming in the Piraus har-bour. As a playwriter, Menander was praised for his truth to life and for his pathos; while his style was full of wit and delicacy, and also of maxims expressing practical wisdom. His language was the ordinary speech of the day, but used with an elegance and simplicity which were the result of the highest art. None of his plays have survived, though there are fragments; and recently some scenes of one of his plays, Georges, or The Farmer, were discovered on a papyrus. But Terence prac-tically translated Menander. The fragments will be found in Meineke's (1841) and Kock's (1880 8) Comicorum Gracorum Frag-menta, and in Grenfell and Hunt's ed. of Georges (1898),

then stayed with Prince Hui of the Liang state till that ruler's death, in 319. Returning to his old position till 311, he devoted the rest of his life to teaching and writing. A fol-lower of Confucius, he taught the elements of practical conduct, both public and private, and shows many remarkable anticipations of present-day ideals in social endeavour. See Life and Works, by Legge (1875); Mind of Mencius, by Faber (Eng. trans. 1882); Gems of Chinese Literature (1884) and History of Chinese Literature, both by Giles (1901).

Mende, cap. of dep. Lozère, S. France, on l. bk. of Lot, 63. m. N.W. of Nîmes; has manufactures of serges and shalloons. doubled-spired cathedral dates partly from the 14th century. Pope Urban v., who was the founder, was a native of Mende. Pop. (1901) 7,319, Mendeleeff, DMITRI IVAN-OWITCH (1834), Russian chemist, was born at Tobolsk in Siberia. Soon after 1856 he began to lecture on chemistry at St. Petersburg University. In 1861 he was appointed professor of chemistry in the Technological Institute of St. Petersburg, and in 1864 professor of chemistry at the univer-The work with which his name is most connected is his enunciation of the periodic law, which, though independently discovered by Newlands, Lothar Meyer, and others, was brought to its highest perfection by him. Mendeléeff has also done most valuable work on specific volume, the expansion of liquids, the specific gravity of alcoholic so-

periments along similar lines. It is on Mr. Bateson's translation of the abbot's paper that the following account is based. Mendel's experiments were carried out on different forms of garden peas, cultivated varieties of Pisum satirum. He chose forms which are known to be constant from generation to generation. In his initial investigations he selected seven pairs. Taking two forms, α and β , which differ from one another in one character only, he crossed them, and so produced a set of hybrid offspring. Call two of these offspring γ and δ . Mendel's doctrine of heredity in its most general form is as follows. As the result of crossing the hybrid forms produced by his first operaof type A and of type B. In graphic form the result is as follows:—



There are thus three possible types of union which may occur. (1) Sex-cells of type A may unite with type A, producing pure forms; (2) sex-cells of type B may unite with type B, producing another series of pure forms; or (3) sex-cells of type A may unite with those of type B, producing a series of hybrid forms. Further, on the doctrine of chance these hybrid forms will tend to be twice as numerous as either of



Menai Strait, from Anglesey Column.
(Photo by Frith.)

lutions, the expansion and compressibility of gases, on the technology of the Caucasian oil industry—in fact, in almost every branch of chemical and physicochemical science. He has written numerous text-books, the most important being Principles of Chemistry (1869), translated into English (3rd ed. 1905). He was awarded the Davy medal of the Royal Society in 1882.

Mendel's Law, or MENDELISM, a term which may be conveniently used to designate certain principles of heredity enunciated in 1865 by Mendel (1822-84), abbot of Brünn, unknown generally until 1900, when his paper was discovered by Professor De Vries, who was himself engaged in ex-

tion, he concluded that the facts are only explicable on the hypothesis that y and & contain each an equal number of the two types of sex-cells (gametes) contained respectively in α and β . This may be elaborated thus: If we call the distinguishing characters possessed respectively by α and β , A and B, then all the sex-cells of a possess the character A, meaning that, if fertilized by sex-cells of the same type, they all possess the power of growing into organisms displaying the character A. So also with the sex-cells of β . But on Mendel's supposition the sex-cells of γ and δ differ from these of the pure parent forms in that they consist of equal numbers the pure forms, so that in 100 fertilizations there will tend to be 25 A's, 25 B's, and 50 AB's. In algebraical form, $A + B \times A + B =$ $A^2 + 2AB + B^2$. Mendel proved the existence of this numerical relation among his hybrids. His proof consisted in rearing the hybrids of the second and subsequent generations, and showing that those which we have described as type A, if interfertilized, remain constant from generation to generation, as under similar conditions do those of type B; but that those of type AB, when interfertilized, give rise to mixed off-spring. This theory involves, of spring. This theory involves, of course, Weismann's assumption of a germ-plasm, as something apart from the body of the parent.

When Mendel crossed σ and β , he found that their hybrid offspring γ , δ , and so forth, displayed the character Λ , to the entire exclusion of the character To this character he gave the name of dominant, while the apparently suppressed character he called recessive. In point of fact, however, the offspring are of three types -the pure-bred A's, the pure-bred B's, and the third These type described as AB's. forms display the dominant or A character, and are therefore not externally to be distinguished from the pure-bred A's. Butand this is the important point they differ in that, while the pure-bred A's, when interfertilized, yield again pure-bred A's only, the offspring of the inter-crossing of the hybrid forms fall into three series-pure-bred A's, pure-bred B's, and hybrid forms or AB's again. A little reflection will therefore show that the hybrid or AB forms of the second generation are entirely comparable, both as regards the character of their germ-cells and as regards their body or somatic characters, to the hybrids of the first generation—that is, to γ and δ . Mendel's principles seem to afford a rational explanation of certain hitherto obscure phenomena of hybridization. See Mendel's Principles of Heredity: a Defence, by W. Bateson (1902), Punnett's Mendelism (1905), and G. Mendel's Briefe an C. Nägeli, ed. Correns (1905).

Mendelssohn, Moses (1729-86), Jewish philosopher and philanthropist, was born at Dessau, on the Elbe. His first pamphlet, Pope, ein Metaphysiker (1755), was written in conjunction with his friend Lessing. He won the prize of the Berlin Academy for an essay, Ueber die Evidenz in den Metaphysischen Wissenschaften (1764). Perhaps his greatest work is the *Phiedon* (1767), a Platonic dialogue on the immortality of the soul. Of great importance from a social point of view is his Jerusalem (1783), in which he discusses questions of religion and toleration, and demands complete separation of church and state. By these works Mendelssohn sought to remove the prejudice of the Germans against the Jews, and at the same time to educate his fellow-religionists. He will always be honoured as one who strove valiantly for the moral and political elevation of the Jews. Lessing's Nathan is a warm tribute to his fine char-acter. In 1786, when Lessing was criticised by Jacobi for his supposed leaning to pantheism, Mendelssohn defended him in the Morgenstunden (1785 - 6). His Werke were published in 7 vols. in 1843-5. Jerusalem is translated into English by M. Samuels (1838), and Phedon by C. Cullen (1789). The best biographies are by M. Samuels (1825), M. Schwab (1868), and M. Kaiserling (2nd ed. 1888). See further M. Kaiserling's M. Mendelssohn (1883), Goldhammer's Die Psychologie Mendelssohns (1886), Adler's Die Versühnung von Gott, Religion und Menschenthum durch M. Mendelssohn (1871), G. Kanngiesser's M. Mendelssohn, seine Stellung in der Geschichte der Aesthetik (1868), and Ritter's Mendelssohn und Lessing (1886).



Mendelssohn-Bartholdy.

Mendelssohn-Bartholdy, JAKOB LUDWIG FELIX (1809-47), German musical composer, was born in Hamburg. In 1811 his father founded in Berlin the well-known Mendelssohn banking business. The boy appeared in public as a pianist before his twelfth year, and in his seventeenth composed the Midsum-Night's Dream overture (1826). In 1829 he made his first appearance in England, and created a great sensation at the Philharmonic concerts in London. In 1833 he became director of music in Düsseldorf, and in 1835 conductor of the Gewandhaus concerts in Leipzig. With the exception of a year in Ber-lin (1841-2), where he acted as director of music in the Academy of Arts, Mendelssohn spent the rest of his life in Leipzig. In 1842 he secured the founding in Leipzig of the conservatorium, and became its director. He made frequent visits to Britain, where his compositions soon became as well known as in Germany. Whether as composer, conductor, pianist, or organist, Mendelssohn's reputation is alike great. symphonies, overtures, and other orchestral compositions; his concertos, sonatas, Fantasia in F

minor, capriccios, and Songs without Words, for piano; also his cetets, quintets, quartets, trios, and other examples of chamber music—all are regarded as standard works. His only violin concerto (E minor), and Trio in D minor for piano, violin, and 'cello, have been exceptional favourites. In oratorio he is perhaps the greatest rival of Handel, his Elijah, St. Paul, and Lobgesang being almost as well known as the Messiah. His numerous songs gave a new interest to the German Lied; and his part songsmany for male voices alone-were a form of composition hitherto almost unknown in Britain. Nearly all Mendelssohn's music is permeated by a spirit of cheerfulness and content. Unlike Beethoven, Schubert, and Schumann, he never sounded the depths of human emotion, but seemed to regard music chiefly as a means of solace and pure as a means of solate and pure enjoyment. See Mendelssohn's Letters, 2 vols. (Eng. trans. by Iady Wallace, 1862-3); also biographical works by E. Wolff (1906), Moscheles (Eng. trans. 1873), Benedict (1853) Lampadius (Eng. trans. 1878), Piller (1874), Dorn (1872), Hensel (Eng. trans. 1882), Devrient (Eng. trans. 1869), Horsley (1873), Schubring (Eng. trans. 1866).

Mendes, CATULLE (1841), French author, was born at Bordeaux. At eighteen years of age he founded La Revue Fantaisiste. His poetical works include Philomela (1863) and Hespérus (1872). He has published many crotic novels and romances, and plays, of which La Part du Roi (1872), Les Mères Ennemies (1880), and Fiamette (1899) are best known.

Mendip Hills, in Somersetshire, England, running some twenty miles from Shepton Mallet towards the Bristol Channel near Weston-super-Mare. There are numerous caverns, which have yielded prehistoric remains. Black Down (1,067 ft.) is the highest summit.

Mendoza. (1.) A w. prov. of the Argentine Republic, contains some of the highest summits of the Andes, and also immense plains. Irrigation is carried out over a large area. (601d, silver, and copper exist, and some mines are worked. Petroleum and coal are found. Area, 56,502 sq. m. Pop. (1900) 141,431. (2.) Capital of above prov., 620 m. by rail N. w. of Buenos Ayres. It was founded in 1559, and destroyed by an earthquake in 1861, after which it was rebuilt a mile nearer the mountains. It is a fine city, and contains handsome churches. The Trans-Andean Railway is to connect Mendoza with Valparaiso (viá Uspallata). Alt., 2,559 ft. Pop. (1901) 29,500.

Mendoza, Daniel (b. 1763), English pugilist, born of Jewish parents, was champion of England (1792). He is spoken of as 'one of the most elegant and scientific boxers recorded in the annals of pugilism.' He had two contests with Humphries, defeating him both times.

Mendoza, Diego Hurtado de. See Hurtado de Mendoza.

Mendoza, INIGO LOPEZ DE

See SANTILLANA.

Mendoza, PEDRO GONZALEZ DE (1428-95), Spanish ecclesiastic, son of the first Marquis of Santillana; became bishop of Calahorra, then of Siguenza, and chancellor of Castile and Leon. One of Honry IV.'s confidential advisers and his executor, and a trusted councillor of Ferdinand and Isabella, he was created cardinal (1473), archbishop of Seville, and archbishop of Toledo (1482). He was active against the Moors.

Menedemus (c. 350-277 B.C.), a Greek, a native of Eretria in Eubea, who became the founder of the Eretrian school of philosophy, which closely resembled the Megarian. Its chief dogma was the oneness of the good; all distinction between virtues was merely nominal. In logic he rejected negative propositions.

Menelaus, in ancient Greek legend, the son of Atreus and the younger brother of Agamemnon, was the successful suitor for the peerless Helen. He was king of Sparta, and there entertained the Trojan prince Paris, who during his absence persuaded Helen to leave her husband and go to Troy with him. Hence arose the Trojan war. In the war Menelaus, in a single com-bat, prevailed over Paris, and would have killed him had not Aphrodite delivered him. After Troy was taken, Menelaus recovered Helen; and after eight years' wandering about the shores of the Mediterranean, he returned home to Sparta. In Homer, Menelaus's character is noble, though not heroic, mild, and amiable; but the tragedians usually represent him as mean, treacherous, and spiteful.

Menelik II. (1843), proclaimed emperor of Abyssinia and king of Shoa in 1889. See ABYSSINIA.

Shoa in 1889. See ABYSSINIA.

Menendez y Pelayo, MarcCRLINO (1856), Spanish critic and bibliographer, born at Santander, is head of the Spanish National Library. His principal works are Historia de las Ideas Esteticas en España (1883); Los Heterodoxos Españoles (1880); La Ciencia Española (controversial essays, 1887-9); Antologia de Poetas Liricos (11 vols. 1890-1903); Estudios de Critica Literaria (1887-95); Calderon y su Teatro (1881); Horacio en

España (1878); and Ensayos de Critica Filosofica (1892).

Menes, first historical ruler of all Egypt, was born at Thinis in Upper Egypt, and is said to have founded Memphis.

Menfi, tn., Girgenti, Sicily, Italy, 33 m. E.S.E. of Marsala; has exports of corn, cotton, and wine. Pop. (1901) 10,888.

Mengo, cap. of Uganda, British E. Africa, on N. shore of Victoria Nyanza, S. of Rubaga, and close to Fort Kampala. The French Mission has built a stone cathedral at Rubaga. Pop. about 77,000.

Mengs, ANTON RAPHAEL (1728-79), Bohemian painter, born at Aussig; was court painter to Charles III. of Spain, wrote works on painting, and was elected president of the Academy of St. Luke at Rome. His best works are Apotheosis of Trajan (Royal Palace, Madrid); an altarpiece at All Souls College, Oxford; and a ceiling in the Vatican. His writings were published in 1786.

Meng-tsu, tn., S.E. of prov. Yün-nan, China, on l. bk. of Red R.; opened to trade (about £1,000,000 annually) with Tongking in 1886. Pop. 12,000.

Menhaden, or MOSSBANKER (Clupen menhaden), an American fish belonging to the same genus as the herring and the shad, which is very common on the Atlantic coasts of the United States. It is much used for bait, and also yields a large amount of oil. The refuse from the oil factories forms the basis of artificial manures.



Menhir, Lochcrist, Brittany.

Menhir, in archæology, is the name given in Brittany to the rude, unhewn upright stones found there, as also in the British Isles, and in many other parts of the world. The word means literally 'tall stone;' but interesting discussions have been raised over the Saxon cognate term of 'hare-stane' or 'hoarstone,' regarding which strong evidence is adduced to show that it denotes a boundary-stone. (See W. Hamper on Hoarstones, 1820; and Archæologia, xxv., 1832.) On the other hand, menhirs occur frequently in groups and alignments, and appear to have been very often

associated with phallic rites. It is customary to apply such terms as trilithon or (Breton) lichaven to that arrangement of megaliths which consists of two menhirs having a third stone laid horizontally across their tops. Including such pillar-stones among menhirs, however, the tallest menhirs in Great Britain are two of those at Stonehenge, and a sculptured pillar at Forres. The largest known menhir was that at Loc-Maria-Ker, Brittany (now broken and prostrate), which stood 62 ft. high, with an estimated weight of 260 tons.

Ménier, EMILE JUSTIN (1826-81), French manufacturer and politician, born in Paris; succeeded his father in the direction of large chemical works at St. Denis and Noisiel, which he abandoned for the manufacture of chocolate, having established large plantations of cacao in Nicaragua. As deputy for Meaux he voted with the extreme left. He wrote L'Impôt sur le Capital (1872), Economic Rurale (1875), and founded La Réforme Economique (1875). His son purchased the island of Anticosti in the St. Lawrence, Canada, as a game preserve in 1886. This led to some friction with the settlers

Menin (Flem. Mcenen), tn., prov. W. Flanders, Belgium, 7 m. w.s.w. of Courtrai. It manufactures cotton and linen tissues, guttapercha goods, and soap, and has bleaching, brewing, tanning. Flax and tobacco are cultivated.

Pop. (1900) 18,611.

Meningitis, or inflammation of the membranes of the brain and spinal cord, is most commonly due to tubercular infection. When of this type, it is characterized by the presence of minute miliary tubercles, and may lead to hydro-cephalus. When non-tubercular, it is generally secondary to disease or injury of neighbouring tissues, such as fracture of the skull and disease of the middle or internal ear. Extensive and severe meningitis may also follow sunstroke, and the disease occasionally breaks out in an epidemic form known as epidemic cerebro-spinal meningitis. The symptoms are legion, but the chief are headache, vertigo, constipation, sickness, squint, optic atrophy, inequality of the pupils, convulsions, and coma. The precise symptoms of an individual case depend on the situation and extent of the inflammatory process. The diagnosis is often extremely difficult, and in all cases the prognosis is grave. Ice to the head or spine and counter-irritation are sometimes useful. Absolute rest and maintenance of the patient's strength are essential, while any condition, such as aural disease, which has been the source of the mischief must be energetically treated.

Epidemic cerebro-spinal meningitis is sometimes known as the 'spotted tever of New York. It is an infective fever associated with the presence of Weichselbaum's Diplococcus in-tracellulario in the fluid and membranes around the brain and cord. Although occurring in epidemic form in many parts of the world, the disease usually breaks out in scattered areas, and does not seem to be communicated The New from man to man. York health authorities, however, have resolved to treat it as an infectious zymotic fever, and to isolate those suffering from it. The symptoms vary to an extraordinary degree, being probably determined by the situation, extent, and intensity of the meningeal inflammation. Spots or petechiæ are by no means constant, and the most characteristic phenomenon is rigidity of the cervical muscles with retraction of the head. In certain fulminant cases death may result within twenty four hours, but in the commoner subacute form of the disease recovery is the rule. The treatment necessarily varies with the symptoms, but in general rest and antispasmodics are indicated.

Meningocele. See Engepha-

LOCELE.

Menippus (fl. c. 60 B.C.) was a native of Gadara in Palestine, and was a Cynic philosopher who wrote satires in Greek, all now lost. Many of Lucian's writings appear to imitate Menippus very closely.

Meniscium, a genus of tropical ferns with simple or once-pinnate fronds. They are mostly easy of cultivation as stove ferns. They like well-drained, loamy soil and plenty of water.

Menispermaceæ, an order of trailing shrubs, mostly natives of tropical countries. The flowers are dieccious and the leaves alternate. Cocculus and Menispermum are among the genera.

Menispermum, a genus of climbing shrubs which are hardy in Britain. M. canadense is a useful climber for shady walls, bearing large, handsome leaves and pendulous raceines of yellow flowers in summer.

Mennonites, a Christian sect organized by and taking its name from Menno Simons (1505-61), originally a Catholic priest in E. Friesland. The Anabaptist movement, springing from a feeling that the reformation had not been sufficiently thorough, had come into conflict with the political authorities in Switzerland, Germany, Moravia, and Holland, and seemed to be finally suppressed at the capture of Münster (1535), to

which various bodies of the persecuted enthusiasts had flocked. The cause was like to be irretrievably lost, when the priest Menno, whose belief in the Catholic dogmas had become unfixed, and who discerned amid the dispersed fragments of the Anabaptists the elements of a true Christian community, resigned his post, was baptized, and set himself to reorganize the body. He furnished it with a doctrine very similar to that of the Reformed Church, still insisting, however, on the baptism of believers only, and the entire sanctity of the members. He introduced the practice of feet-washing, and enjoined abstention from civil and military service, and from the taking of oaths. By means of a very strict discipline he succeeded in fostering a spirit of true piety and almost ascetic morality in the community, which gradually gained for itself the esteem of its opponents and liberty of conscience, and laid the basis of further ad-vance. Notwithstanding several disruptions, the Mennonites increased, and spread through Holland and Germany to Switzerland, Russia, and (especially from the latter country about 1871) to the United States and Canada, where they now number over 100,000, chiefly engaged in agriculture, and bearing among their neigh-bours a high reputation very similar to that of the Friends. Browne's Life of Menno (1853).

Menominee, Algonquian tribe of Indians, generally resembling the Ojibwa, but with a distinct language. Formerly ranging over N. Wisconsin and Upper Michigan, they now occupy a reservation near Green Bay, Wisconsin. In 1901 they numbered 1,390.

Menominee, city, Michigan, U.S.A., co. seat of Menominee co., on Green Bay, 100 m. s.w. of Marquette; is a shipping port for lumber. Pop. (1900) 12,818.

Menominie, tn., cap. of Dunn co., Wisconsin, U.S.A., on Red Cedar R., 60 m. E. of St. Paul, Minnesota. It has trade in lumber and grain. Pop. (1900) 5,655.

Menopome, or Mud-Devil (Menoponal alleghaniensis), an amphibian which occurs in the rivers of N. America. It may reach a length of two feet, and is grayish in colour, spotted with black. Both fore and hind limbs are present, the posterior bearing membranous fringes on their outer sides.

Mensa, a small constellation inserted by Lacaille (1752) between Dorado and the south pole, and named Mons Mensa from Table Mountain at the Cape. It includes a portion of the greater Magellanic Cloud, but no stars brighter than 5°3 magnitude.

Menshikov, ALEXANDER DANILOVITCH (1672-1730), Russian marshal and statesman, was born at Moscow. He succeeded Lefort as the favourite of Peter the Great, whom he accompanied on his travels through Europe. He played a prominent part in the war with Sweden (1702-13). At the capture of Marienburg, Catherine, whom Peter afterwards married, fell into Menshikov's hands. After Peter's death (1725) he secured the throne for Catherine, and during her reign was the real ruler of Russia. But soon after the accession of Peter III, he was ousted from power by the Dolgorukis and banished to Siberia, where he died.

Menshikov, ALEXANDER SERGEIEVITCH (1789) 1869), Russian general and diplomatist, a prominent member of the old Russian party, served in the campaigns of 1812–15, becoming general, and head of the navy, which he made highly effective. He was ambassader to Constantinople (1853), his arbitrary behaviour there hastening the Crimean war. He held the chief civil and military command in the Chimea, but was disastrously defeated at the Alma (1854); commanded at Inkerman, and held

Sebastopol. Menstruation, the periodic discharge of sanguineous fluid from the non-pregnant uterus between the ages of puberty and the climacteric. The duration is from three to eight days, and usually an interval of twentyeight days clapses between the onset of one period and that of the next. The function is suppressed in many diseases that produce debility, and is generally suspended during lactation. The discharge is due to the shedding of the lining membrane of the uterus, and is usually associated with the separation of an ovum from the ovary. Menstruation occurs only in the human female and in the higher apes.

Mensuration establishes rules for the measurement of lengths, areas, and volumes. Mechanical methods have been devised for the calculation of irregular lengths and areas, and curves whose equations are known are best treated by the calculus. A very close approximation to the area of any closed curve may be got by Simpson's rule. The volume of a solid of revolution is equal to the area of the generating figure, multiplied by the circumference described by the centre of gravity. Geometry and trigonometry are the bases of mensuration. The principal working rules of mensuration are:—

Areas of Plane Figures.—Triangle = $\sqrt{s(s-a)}$ (s-b) (s-c), where a, b, c are the sides and

s is the semiperimeter, or $= \frac{1}{4}$ base × height, or = $\frac{1}{2}$ ac sin B, where B is the angle between a and c. Parallelogram = base × height; square = (side)2. Trapezium = $\frac{h}{2}$ (a + b), where h =height and a, b the parallel sides. Quadrilateral = $\frac{1}{2}$ diagonal × maximum offsets. Circle = πr^2 , where $\pi = 3.14159$ and r =radius. Circle sector = $\frac{r}{2}$ arc, = $\frac{1}{4} r^2 \theta$, θ being in radians. Segment $=\frac{4h}{3} \sqrt{\frac{c^2}{4} + \frac{2h^2}{5}}$, where c =chord and h = height. Ellipse = π_{ab} , a, b = semi-axes. Parabola = 3 base × height = 3 \triangle formed by tangent, ordinate, and diameter. Cycloid=thrice area of

by 1 m. In it are three islets. To one, Inchmahome, Mary Queen of Scots was sent after the battle of Pinkie (1547); on it is an Augustinian priory (1238). On another was the stronghold of the Earls of Menteith.

Menthe, or Crême de Menthe, a liqueur, of which two varieties, a green and a white, are sold. Both should be prepared from the finest grape alcohol, flavoured with menthol and similar essential oils. When well-matured, it is said to possess digestive properties. Menthe is rather dry than sweet.

Menthol, or Peppermint Cam-PHOR (C₁₀H₁₉OH), is obtained from the plant Mentha piperita, which grows in England, and from Mentha arvensis, found in Japan. The oil obtained by dis-

Mensuration of Volumes and Surfaces of Solids.

Solid,	Volume.	Surface,
Sphere	$\frac{4\pi r^3}{3} = i \text{ circum-cylinder}$	$4\pi r^2$
Segment	$\frac{3}{\pi h} (h^2 + 3R^2)$	$2\pi r h$
Cylinder Prism	0 π _f :2 h Base area × height	$2(\pi r^2 + \pi r h)$ Ends + sides
Cone	$\pi r^2 \frac{h}{3}$	$\pi r^2 \times \text{slant height}$
Pyramid	Area of base $\times \frac{h}{3}$	Base + slant surface

r = radius, h = height, R radius of segment or zone.

generating circle = { circum-rectangle. Regular polygon perimeter = $2nr \tan \frac{\pi}{n}$, or $2nR \sin \frac{\pi}{n}$. Regular polygon area = $nr^2 \tan^{\pi}$, or $\frac{nar}{2}$, or $=\frac{nR^2}{2}\sin{\frac{2\pi}{n}}$, or $=\frac{na^2}{4}$. $\cot \frac{\pi}{n}$, where a = side and n =number of sides, r = radius of inscribed circle, and R = radius of circumscribed circle. In the following regular polygons, multiply the square of the side by the the polygon area:—Pentagon, 172048; hexagon, 259808; hepagon, 363391; octagon, 482843; nonagon, 618182; decagon, 769421. The areas of similar figures vary as the squares of their like linear dimensions, and the volumes of similar solids as the cubes of their like linear di-

Mentana, vil., Italy, 13 m. N.E. of Rome, where in 1867 Gari-baldi was defeated by the French and papal troops. Pop. (1901)

mensions.

Menteith, LAKE OF, in S.W. Perthshire, Scotland, 17 m. N.W. of Stirling. It measures 11 m.

tilling the fresh plant is cooled; whereupon prismatic crystals (m.p. 42° c., b.p. 212° c., sp. gr. 88), with a peppermint odour, separate out. They are slightly soluble in water. When tasted, or rubbed on the skin, menthol causes a sensation of coldness, which is utilized to produce a sort of local anæsthesia in the treatment of neuralgia. It has also an antiseptic action.

Mentone (Fr. Menton), tn., dep. Alpes-Maritimes, France, on the Mediterranean, 14 m. N.E. of Nice. It has a fine climate, and is a very popular winter resort of the Riviera. It is sheltered to the N. by mountains, dotted with orange and lemon groves. Its harbour, built in 1890, has a depth of 24 ft. There is a trade in olive oil and perfumes. In 1861 it came under French rule, the prince of Monaco yielding up his rights for four million francs. It suffered from an earthquake in 1887. Pop. (1901) 9,944.

Mentor, in the Odyssey, a native of Ithaca, to whom, on leaving his home, Odysseus entrusted the care of his house and of his son Telemachus, whose adviser he was -hence the use of the name as equivalent to a wise counsellor.

Mentzelia, a genus of halfhardy herbaceous plants belonging to the order Loasacese. They are mostly natives of N. America, and are of easy cultivation. They bear coarsely dentate leaves, and generally large flowers of much beauty.

Menufieh, prov., Lower Egypt, extending for 40 m. from the junction of the main arms of the Nile, along the r. bk. of the Rosetta arm. Area, 639 sq. m. Pop. (1897) 864,206.

Menura. See Lyre-Birds. Menyanthes, a genus of hardy aquatic plants bolonging to the order Gentianaceae. They are easily established in boggy ground. M. trifoliata, the common buckbean or bogbean, is a native of Britain. It has trifoli-ate leaves, and bears reddish-

white flowers in spring.

Menzaleh, LAKE, lagoon,
Lower Egypt, 30 m. long, with
average breadth of 20 m.; is very shallow, and 460 sq. m. in extent. It lies close to the Mediterranean, and is traversed by the Suez Canal. It has valuable

fisheries, and produces salt.

Menzel, ADOLF (1815-1905), German painter, was born at Breslau. He sums up in his work the development of German nationality as a whole, of German modern life, expressed with extraordinary realistic, vivid power, wholly at variance with the religious and literary painting of his early contemporaries. He began life as a draughtsman: was the historical painter of Frederick the Great (1839-42); later, the historical painter of the newlyfounded empire. His King Wilhelm Starting to join the Army, 1870 throbs with life. He reached his full development when he began to depict labouring humanity. His most important picture, Iron Mill (1870), is powerful in the delineation of figures and treatment of lurid smoke and light. See M. Jordan and R. Dohme's Das Werk A. Menzels (1886-91, and 1895-1905); Von Tschudi's Adolf von Menzel (1906); and Knackfuss's Menzel (ed. 1897).

Menzel, Wolfgang (1798-1873), German historical writer, born at Waldenburg (Silesia); became a schoolmaster in Switzerland, and from 1826 lived mostly land, and from 1820 liven mostly at Stuttgart. He was a keen controversialist, and attacked especially the politico-literary school of 'Young Germany.' His chief works are History of Germany.' 1008. Park tennal [191]. chief works are History of Germany (1825; Eng. trans. 1848); History of German Literature (1827; Eng. trans. 1840); Die Deutsche Dichtung (1858); Allge-meine Weltgeschichte (16 vols. 1862-72); he also wrote on mythology and theology and Denkwürdigkeiten (1877).

Menziesia, a genus of hardy N. American and Japanese shrubs belonging to the order Ericaceæ. They bear terminal corymbose fascicles of more or less globose flowers, and are very decorative plants for rock gardens. They require a peaty soil and a moderate degree of moisture.

Menzini, BENEDETTO (1646-1704), Italian poet, born at Florence. He became a priest, served Christina of Sweden and various cardinals, and finally obtained a canonry and the chair of eloquence at the Roman archi-gymnasium. One of the first members of the Arcadia, he wrote twelve Satircs in terzines (1728), which take a high rank among a sncering cynic, the embodiment of all that is worst in man's intellectual nature.

Meppel, tn., Netherlands, prov. Drenthe, 17 m. by rail N.E. of Zwolle, manufactures linen, tobacco, and sailcloth. (1899) 10,154.

Mequinez. See Mekinez. Meran, tn., Tyrol, Austria, Meran, tn., Tyrol, Austria, 100 m. s.w. of Innsbruck, is a winter resort, at the foot of the Küchelberg (1,000 ft.). Here is the half-ruined castle of Tyrol, which gives name to the principality. Pop. (1900) 9,284,

Mercadante, Saverio (1797-1870), Italian operatic composer, was born at Altamura in Apulia, and studied at Naples. For some following pages show for the United Kingdom and the other principal maritime countries the progress made over a series of years, and the present position of merchant shipping.

I. MERCHANT NAVIES.

Although Britain is the chief ocean-carrier of the world, the true importance of her shipping is apt to be overlooked by reason of the fact that its carnings do not show directly in the Board of Trade returns. As a matter of fact these earnings (which are in the nature of invisible exports) account for a very large part of the excess of imports into the United Kingdom as compared



Mentone.

pieces of the kind. His Opere were collected at Florence (1731-32), the 4th and last volume containing a Life by Paolucci. See monographs by Magrini (1885), Bufardeci (1897), and Gallenga Stuart (1899).

Mephistopheles, a Satanic personage of the middle ages. In the earlier forms of the Faust legend Mephistopheles appears merely as a familiar appointed to obey Faust's commands, ac-cording to the terms on which the latter had sold his soul to Satan. Marlowe gave an individuality to Mephistopheles, and endowed him with a melancholy dignity. Goethe allowed him no attractive quality, but made him

time he was musical director at the cathedral of Novara, and from 1840 till his death-though blind from 1862-was director of the conservatorium at Naples. His most successful works were L'Apoteosi d'Errole (1819), Elisa e Claudio (1822), I Briganti (1836), and Il Giuramento (1837).

Mercantile Law. For the sources of mercantile law, see LAW-MERCHANT; and for special branches, see APPRENTICE, BANK-RUPTCY, BILL OF EXCHANGE, CAR-RIER, COMPANY, DEBT, EMPLOY-ER'S LIABILITY, INSURANCE, LIEN, MERCHANT SHIPPING, PARTNER-SHIP, STOPPAGE IN TRANSITU.

Mercantile Marine of the World. The tables given in the

with exports thence. In 1903 they were estimated at £90,000,000 a year. Ships are measured by their tonnage, either 'gross' or 'net.' 'Gross' tonnage is an arbitrary reckoning of the cubic contents of a ship converted into tons at 100 cub. ft. = 1 ton. 'Net' tonnage is the 'gross' tonnage less certain recognized deductions for engine-rooms, accommodation for captain and crew, etc.; and it is upon the 'net reg-istered tonnage' (which is supposed roughly to correspond with the cargo-carrying or freight-earning capacity of the ship) that dues are usually assessed against merchant ships. The system of measurement is so arbitrary that there

Table I.—Merchant Navies (Net Tonnage on Register).

Sailing and steam vessels, in roman type; steam vessels only, in italics.

	1850,	1860.	1870.	1880.	1890.	1900.	1905.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tous.
United Kingdom	3,565,133	4,658,687	5,690,789	6,574,513	7,978,538	9,304,108	10,735,582
	168,474	454,327	1,112,934	2,723,468	5,04z,577	7,207,610	9,064,816
British Possessions	667,829	1,052,281	1,458,345	1,872,658	1,709,550	1,407,284	1,596,822
	19,157	45,817	89,200	225,814	371,189	532,188	690,450
British Empire	4,232,962	5,710,968	7,149,134	8,447,171	9,688,088	10,751,392	12,332,404
	187,631	500,144	1,202,134	2,949,282	5,413,766	7,739,798	9,755,266
German Empire (vessels of 17½ tons and upwards)			982,355 81,994	1,181,525 \$15,758	1,433,413 723,652	1,941,645 1,847,875	(1904.) 2,352,575 1,774,072
Norway (vessels of 4 tons and upwards)	298,315	558,927 	1,022,515 13,715	1,518,658 58,06\$	1,705,699 203,115	1,508,118 505,443	(1905.) 1,366,527 669,219
France (vessels of 2 tons and upwards)	688,153 13,9\$5	996,124 68,025	1,072,048 154,415	919,298 277,759	944,013 499,921	1,037,726 527,551	(1903.) 1,235,341 585,132
Italy (vessels of 2 tons and upwards)		::	1,012,164 82,100	909,196 77,050	820,716 186,567	945,008 376,844	(1903.) 1,044,758 460,535

Table II.

Country.	Year.	Total net tonnage on register.	Steam tonnage.
Sweden (ships of 20 tons and upwards)	1903	647,851	375,999
Russia (ships of 25 tons and upwards)	1903	668,543	384,857
Denmark (ships of 4 tons and upwards).	1904	449,117	294,199
Holland	1904	401,328	341,964

Table III. - Mercantile Marine of the United States. Registered for Oversea (Foreign Trade).

i		1850.	1860.	1870.	1880.	1890.	1900.	1905.	
	Gross tons Steam			1,516,800 192,544					

Table IV.

Country.	Number of	Net Tonnage	Percentage of
	Steamships.	(Sail and Steam).	whole World.
United Kingdom	10,122	10,269,000	43·8
British possessions	4,140	1,563,000	6·6
British empire	14,262	11,832,000	50·4
Germany	1,622	2,322,000	9·9
Norway	1,396	1,444,000	6·1
France	1,383	1,235,000	5·3
Italy	501	1,045,000	4·4
Russia and Finland	::	1,020,000	4·4
Other countries		4,560,000	19·5
Grand total		23,458,000	100.0

is no certain relation between the gross and net tonnage of a given ship, a great deal depending on the shape of its build; but upon a large aggregate the net tonnage generally works out at about two-thirds of the gross tonnage. As regards the relative earnings

of steamships and sailing ships, Sir Robert Giffen, in 1882, estimated the gross earnings of steam at £15 per registered net ton, and of sail at £5 per net ton. In 1898 he revised this estimate to suit changes in freights and speed, and arrived at £12 for steam, and £4 for sailing vessels per registered net ton (Royal Statistical Society's Journal, 1899, p. 11). In other words, steam tonnage may be reckoned three times as efficient in earning power as sailing tonnage.

Table I. shows the principal merchant fleets of the world. Other important navies are given in Table II. With regard to the United States, the returns are made in gross tons, and are therefore not comparable with those already given. (Table III.) Besides a relatively small merchant navy engaged in the foreign trade, the United States have an immense fleet of lake and river ships—6,456,543 gross tons (of which 3,741,494 tons steam) in 1905. Taking two-thirds to represent roughly the net tonnage, we may estimate the net registered tonnage of the United States oversea meichant marine at 600,000 tons (370,000 steam).

The proportion of the world's mercantile marine held by the principal countries in 1903 is shown in Table IV.

Included in other countries are the United States, Spain, and Japan, taken at two-thirds of gross tonnage. The lake and river shipping of the United States has been ignored.

II. SHIPBUILDING.

According to Llovd's Register Book, in 1901 the United Kingdom built one and a half times as much tonnage as all the rest of the world put together. The tonnage built fluctuates considerably from year to year; but during the last forty years shipbuilding has been one of our greatest and most successful industries.

Table V.-Merchant Tonnage Built in the United Kingdom.

Year.	For Home and Colonies.	For Foreigners.	Total.	
1000	Net Tons, 211,968	Net Tons.	Net Tons. 225,871	
1860 1870	342,706	13,903 51,651	394,357	
1880	403,841	69,055	472,896	
1890	652.013	160,625	812,638	
1900	736,906	207,361	944,267	
1902	800,374	150,051	950,425	
1903	629,069	129,308	758,377	
	851,433	197,015	1,048,448	

Table VI.

Country.	Total Tonnage Built.	Add Tonnage Bought Abroad.	Deduct New Ton- na re Sold Abroad.		Old Ships Sold,	Lost by Wreck,
United Kingdom	Net Tons. 983,133	Net Tons.	Net Tons. 207,452	Net Tons. 775,681	Net Tons. 176,068	Net Tons. 131,900
Germany	101,886	139,038	••	240,924	40,975	41,103
France	105,682	31,620		137,202	18,452	30,774

Table VII.—Tonnage of Sailing and Steam Vessels Entered and Cleared in Foreign Trade at Ports in the United Kingdom, in Millions of Tons, with Cargoes and in Ballast.

Nationality.	1860.	1870.	1889.	1890.	1900.	1905,
British ships	13 9	25.1	41:3	54:0	*62-7	70.9
Norwegian	1.2 2.3 3.0	2:8 1:8 1:3	4·0 3·2 1·0	5·0 4·4 ·3	7·7 6·0 ·5	6:7 8:5 1:3
Total foreign	10.8	11.5	17:4	20.3	35.8	11.0
Grand total	24.7	36.6	58:7	74:3	98.5	1120
Proportion per cent. of British to total	56.4	68:4	70-4	72.7	63.7	63:3

 $^{^{\}bullet}$ Not included in this total, the shipping trade on government account to and from S. Africa represented 1,572,000 tons.

Table VIII.

Year.	British Satlors.	Foreign Sailors.	Proportion per 100 British,	Lascars and Asiatics.	Total Employed.	Proportion of Sailors to 100 Tons.
1888	179,969	25,277	14:05	18,427	223,673	3.0
1892	185,437	30,899	16.66	25,399	241,735	2.86
1897	175,549	33,898	19:31	31,484	240,931	2.70
1903	176,520	40,396	22.88	41,021	257,937	2.51
1905	180,492	39,711	22.0	43,483	263,686	2·10
ı	1	1	1	i	1	

The figures (see Table V.) include trifling amounts (the greatest being 11,518 tons in 1900) representing warships built for foreigners; they do not include warships built for or by the British government (in 1901 over 200,000

tons displacement). During the twelve years 1894-1905 the total tonnage of sailing ships built has not reached 100,000 in any one year, but so recently as 1892 287,000 tons of sailing ships were built in that year, being the

highest total for sail on record. The nearest figure to this was 274,000 tons in 1864. In 1905 1,007,494 tons (net) of steam tonnage were built in the United Kingdom. Table VI. gives an instructive comparison for 1901.

On the average of the last five years, the United Kingdom builds about 900,000 tons a year, Germany 100,000 tons, and France 70,000 tons. It is impossible to make any comparison with the United States, owing to the difference in the statistical returns.

III. SHIPPING TRADE.

The work which is done by merchant navies is expressed by adding together the tonnage of all the vessels entering the ports of a country ('entrances'), and also that of all vessels leaving the ports ('clearances'), in each case counting each vessel as often as it 'enters' or 'clears.' (Table VII.)

Besides carrying from 60 to 70 per cent. of the immense oversea trade of the United Kingdom, the British mercantile marine engages in the carrying trade between foreign countries.

In 1904 the net tonnage passing through the Suez Canal was 4,237 ships of 12,250,000, of which 2,679 ships and 8,000,000 tons were British. Germany came next with a fifth of England's tonnage, and France third with one-ninth.

IV. PERSONS EMPLOYED.

The chief points with regard to the manning of our merchant navy are—(1) the small increase of numbers relatively to the large increase of tonnage; (2) the increasing proportion of foreigners employed; and (3), a corollary to (1), the smaller proportion of hands employed per 100 tons of shipping. Forty years ago (in 1860), exclusive of masters and lascars, there were 157,000 British sailors and 14,000 foreigners (9 to every 100 British), or a total of 171,000 men for a feet of 4,659,000 tons, giving 3'67 persons per 100 tons. Table VIII., which includes masters and lascars, shows the state of affairs since 1888.

Mercantilism. The system designated by Adam Smith 'the commercial or mercantile' made its first decided appearance in England under the Tudors (1485–1603), and a similar development took place in France, Spain, and Germany during the 16th century. But it was in the 17th century that mercantilism attained its full development both in theory and practice. Not only do writers such as Montchréstien and Munst het leading conceptions of the system, but statesmen like Cromwell in England and Colbert (1662–83) in France strove to pro-

mote it, the former by the Navigation Laws, and the latter by the elaborate measures regulating French industry and commerce. Mercantilism is best understood by regarding it, not as a scientific body of doctrine, but rather as a course of policy to be pursued by the enlightened statesman. Its root-idea is the promotion of national power by improving eco-nomic resources. In accordance with current ideas, the influx of money, the increase of exports, the growth of population, manufactures, and shipping, and the acquisition of colonies, should be encouraged, since, it was believed, more wealth is thus obtainable. Excessive imports or expenditure on foreign luxuries were regarded with disapproval, as tending to impoverish the state. Again, it is necessary to distinguish be-tween different degrees of mercantile doctrine. The crude view that money is the sole wealth was not held by Locke, Petty, or Child, nor indeed by the better class of traders. They preferred to dwell on the superior dura-bility and effectiveness of gold and silver, and the importance of so regulating trade as to pro-cure a favourable balance. The French school of économistes vehemently assailed the whole plan of trade restrictions, and this task was completed by the conclusive arguments of the Wealth of Nations. On the practical side, the revolt of the American colonies marked the breakdown of a prominent part of mercantile policy, and the change in political conditions produced by the French revolution led to the transition to the protective system.

protective system.

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Mercaptans, or Thio-Alco-HOLS, are a class of compounds constituted like the alcohols, but with the oxygen of the hydroxyl group replaced by sulphur. They are inflammable liquids of a disgust-ing odour of garlic. They are oxidized to sulphonic acids, and readily combine with mercuric oxide.

Mercator, whose real name was GERHARD KREMER (1512-94). was born at Rupelmonde in Flanders. In 1552 he was appointed cosmographer to the Duke of Cleves, and lived at Duisburg from that year till his death. His chief work was his great atlas (1585-1602). The name 'atlas' for a collection of maps was introduced by Mercator. He gained still more lasting fame by the invention of his projection (see PROJECTION), on which all marine charts are drawn, as well as many maps of the world. He was also the author of the projection known as Bonne's and of the equidistant polar projection. See Gérard Mercator, by Van Raemdonik (1869).

Mercedes. (1.) Town, Buenos Ayres prov., Argentina, 40 m. by rail w. of Buenos Ayres, in a district occupied chiefly by Irish. Pop. 18,600. (2.) Capital of Soriano prov., Uruguay, 20 m. E.S.E. of Fray Bentos. It is an invalid resort, and trades in wool. Pop.

Mercenaries, a term generally restricted to professional soldiers who are aliens to the state which they serve for hire. The decadence of the Roman empire was greatly due to the substitution of foreign mercenaries for the Roman legions. The emperors at Constantinople maintained a Varangian guard of Scandinavian mercenaries. In the middle ages there were many 'free companies' of adventurers, who were ready to sell their services to any prince who would engage them. In the Thirty Years' war the large armies which contended in Germany under Tilly, Wallenstein, and Gustavus Adolphus were often largely composed of mercenaries. (See LANDSKNECHTE.) The kings of France had body-guards of Scottish and Swiss archers; and up to the date of the revolution there were Swiss, German, and Irish regiments in the French army, which contains, even now, a foreign legion. Holland at one period had Scottish and Irish regiments in her service. During the war against Napoleon the British army contained German and even French corps. Our own last experience of mercena-

ries was during and after the Crimean war, when German, Italian, and Swiss battalions were raised by recruiting agencies abroad. The Swiss have at all times shown a remarkable predilection for service under a foreign flag, and to this day they still furnish a bodyguard to the Pope. The mercenary regiments of the 17th and 18th centuries were usually raised by an agreement between the state desiring their services and some soldier of fortune, who enrolled the men and afterwards commanded the corps as its colonel.

Several regiments of the British army were at one time mer-cenaries. Thus the Royal Scots served the king of Sweden from 1625 to 1633, after which it several times took service with France (where it was known as the Régiment de Douglas) before its in-corporation in the British army in 1678. The East Kent regiment, better known as the Buffs, was, previous to 1665, in the Dutch service. The Northumberland Fusiliers (originally an Irish corps) and the Royal Warwickshire regiment, both accompanied William III. to England, and passed from the service of Holland to that of Great Britain. The old 94th Foot (or Scots Brigade), disbanded in 1818, was taken over from the Dutch service in 1793.

Mercerization, a process of treating cotton discovered by John Mercer, and patented in 1850. The cotton is treated at ordinary temperature with a strong solution of caustic soda (sp. gr. 1'2 to 1'3), with the result of shortening and thickening the walls of the fibre. If the fibre is then washed, the cotton appears silky and crinkled; the lustre is much increased by stretching the fibre during the process back to about its original length before mercerization. The product dyes well, and is much employed for manufacturing cotton fabrics with a silky lustre, or, if the caustic soda is applied locally by printing, to produce a crape or crimped material.

Merchandise Marks. The Merchandise Marks Acts, 1887, 1891, and 1894 (the last of which does not apply to Ireland), make it an offence punishable on summary conviction by four months' imprisonment, or a £20 fine, and on indictment by two years' imprisonment and a fine, or by a fine only, to forge any trademark, registered or unregistered; to use a mark calculated to deceive; to apply a false descrip-tion to goods as to quantity, quality, place of origin, or method of manufacture; knowingly to sell such goods. Foreign goods which would otherwise infringe the act may be stopped on importation, unless they are marked with the name of the country of origin. Innocent parties acting in good faith are protected. Offending good sare torfeited. Prosecutions affecting the general interest of the country may be undertaken by the Board of Trade, or by the Board of Agriculture in agricultural matters. See Trade-Marks.

Merchant Adventurers, a trading guild established by the Duke of Brabant in 1296, but afterwards extended to England, where the company received the title by patent of Henry VII. in 1505. In 1564 the guild was incorporated by Queen Elizabeth, and was granted extensive privileges in the East, afterwards leading the attack on the East India Company in the reigns of James I. and Charles I. The Merchant Adventurers dealt chiefly in woollen cloths.

Merchants, STATUTE OF. See

ACTON BURNELL.

Merchant Shipping. The law on matters connected with the mercantile marine was consolidated by the Merchant Shipping Act of 1894. Of this very long act it is only possible to give

the salient provisions.

Part I. deals with registry. The owners of British ships must be British subjects, either born or naturalized; and, with the exception of some small coasting and fishing vessels, all British ships must be registered. The property in a ship is divided into sixty-four shares. The shares sixty-four shares. The shares may all be owned by one person, or all by different owners, but no one can be registered as the owner of a fraction of a share, although any number not ex-ceeding five persons may be registered as joint-owners of one share. Before registration a ship must be surveyed, and measured, and marked (name, number, and scale showing draught). The scale showing draught). registrar enters in the register book (1) the name of the ship and port; (2) the details of the surveyor's certificate; (3) the particulars of origin declared by the owner; and (4) the names of the registered owners and the proportion of their interest. His certificate of registry is necessary for the lawful navigation of the ship.

Part II. deals with masters and seamen. All foreign-going ships and home passenger ships, and foreign steamships carrying passengers between places in the United Kingdom, must carry a master and other certified officers in proportion to the size of the ship. Local marine boards hold examinations and report to the Board of Trade, which grants certificates of competency. A master must enter into an agreement

with his crew containing all particulars required by the Board of Trade as to the nature and duration of the voyage, the capacity in which each of the crew is engaged, wages, scale of provisions, etc. A seaman is not entitled to the rating of A.B. (able-bodied seaman) until he has served four years. The seaman served four years. is entitled to a certificate of discharge, stating the period of his service, and a report on conduct and qualifications. There are provisions for securing the payment of seamen's wages, giving facilities with regard to money orders and savings banks, and for protecting the property of deceased seamen, and for reimbursing poor-law authorities who have given relief to the families of seamen during absence. Penalties are imposed upon masters who leave in the United Kingdom destitute lascars and other natives of countries not having a consular office in this country, and provision is made for their relief. Sections 186 to 189 protect seamen from being discharged abroad without employment or the means of obtaining a passage home; and sections 190 to 194 provide for the relief. maintenance, and return home of seamen and apprentices found in distress abroad. Seamen may leave their ships in order to enter the navy without being guilty of descrition. The act enables seamen to complain as to bad or insufficient food or water to naval, consular, and customs officers, and to obtain compensation; it provides for the inspection of ships as regards provisions for health, also for the carrying of a doctor by foreigngoing ships having one hundred persons on board. Each seaman is entitled to seventy-two cubic feet of space and twelve feet superficial measured on the deck of his cabin. Sections 220 to 238 contain provisions as to the nature and punishment of misconduct endangering life or ship, desertion, or absence without leave, and other offences against discipline. Sections 239 to 243 deal with official logs and the entries which must be made in them, and the penalties for failing to keep them correctly, or falsifying or destroying them. The log of a foreign-going ship must be delivered to the superintendent before whom the crew is discharged. At every port where there is a local marine board, and at other ports if the Board of Trade so direct, there must be established a mercantile marine office with the requisite buildings, property, superintendents, clerks, etc. The general ents, clerks, etc. The general business of a mercantile marine office is conducted by the superintendent or his deputy, and consists in affording facilities for engaging seamen by keeping registries of their names and characters, superintending the engagement and discharge of seamen, arranging for getting engaged seamen on board at the proper time, facilitating the making of apprenticeships to sea service,

and so forth.

Part III. deals with passenger and emigrant ships. Every passenger steamer which carries more than twelve passengers requires an annual certificate from the Board of Trade, as a guarantee that the ship is sufficient for the service, and is properly equipped and officered. It states the number of passengers that may be carried, and the act imposes heavy penalties for carrying more. Emigrant ships include all ships carrying more than fifty steerage passengers, or, in the case of small ships, a smaller number proportioned to the registered tonnage of the ship. An emigrant ship must be surveyed and reported seaworthy before leaving port, and she must be properly equipped with compasses, chronometers, a fire-engine, anchors, cables, signalling apparatus, etc. The act provides for the proper supply of provisions, water, and medical stores; prohibits the carrying of dangerous goods, or cattle; requires a medical practitioner to be carried when there are more than fifty steerage passengers, or the number of persons on board altogether exceeds three hundred; and regulates, according to the number of passengers carried, the carrying of steerage passengers, stewards, cooks, interpreters, and an efficient crew. The passengers and crew of an emigrant ship must be medically inspected before the ship clears, and any persons reported unfit to proceed, or a danger to others, must be landed. The master and the owner or charterer, or some other sufficient person, must enter into a bond for £2,000 for the repayment to the crown of all expense incurred under the act in rescuing, maintaining, and forwarding to their destination all steerage passengers who, by reason of shipwreck or any other cause except their own neglect or fault, are not conveyed as agreed to their intended destination. an emigrant ship proceeds to sea without the master obtaining a certificate for clearance, the ship is forfeited to the crown, and may be seized by any officer of customs; but the Board of may release the forfeited ship subject to the payment of any sum not exceeding £2,000. The sale of spirits to steerage passengers during a voyage is absolutely prohibited. A steerage passenger is entitled to remain on the ship and be provided for as on the voyage for forty-eight hours after reaching his destination, unless the ship has to leave port to continue her voyage. If a steerage passenger is not received on board before six on the day of embarkation, or does not obtain a passage, or is detained at the port of departure, or is landed at the wrong port, he may recover his passage money, with damages not exceeding £10; or in the case of detention, he may receive subsistence money for the period of delay. Emigration officers are appointed in the United Kingdom by the Board of Trade, and in British possessions by the governors, for performing the duties assigned to them by this part of the act.
Part IV. deals with fishing boats. See Sea Fisheries.

Part v. deals with safety. Regrart v. deals with salety. Regulations are made by Order in Council, on the joint recommendation of the Admiralty and the Board of Trade, for the prevention of collisions. (See Col-LISIONS AT SEA.) Accidents to steamships, and the loss of any British ship, must be reported to the Board of Trade. The Board of Trade makes rules as to life-saving appliances to be carried, for which see LIFE-SAVING APPARATUS. The Privy Council makes rules as to what shall be signals of distress, and the act imposes penalties for the use of them except in the case of a ship in distress. A ship must be marked with lines, not less than twelve inches long and one inch broad, showing the position of each deck above water, and must also be marked with a load-line. Every person who sends or attempts to send a ship to sea, or the master of a ship who knowingly takes her to sea, in such an unseaworthy state as to endanger life. is guilty of a misdemeanour, unless it is proved that all reasonable means were taken to insure her being sent to sea in a seaworthy condition, or that her going to sea in an unseaworthy condition was, under the circumstances, reasonable and justifiable. The Board of Trade, on complaint or otherwise, may detain any British ship in a port of the United Kingdom on the ground that she is unfit to proceed to sea without danger to life. The power of detention on the ground of unseaworthiness applies, with necessary modifications, to foreign ships. In proceedings against seamen for desertion or absence without leave. if one-fourth of them allege that the ship is not fit to proceed to sea, or that the accommodation is insufficient, the court may, if

not satisfied that the allegation is groundless, order the ship to be surveyed; and if the allegation turns out to be true, the master or owner must pay the costs of the survey, and compensation to the accused seamen.

Part VI. deals with special shipping inquiries and courts. For inquiries as to shipping casualties, see WRECK. A naval court may be summoned by an officer commanding one of his Majesty's ships on a foreign station, or, if there is no such officer, by a consular officer. Such court consists of not more than five nor less than three, and one must be a naval officer not below the rank of lieutenant, one a consular officer, and one the master of a British merchant A naval court may, if unanimous, remove the master of a ship and appoint some one else with the consent of the consignee; may cancel or suspend the certificate of a master, mate, or engineer; discharge a seaman from his ship; and direct the payment of costs. A court of survey for a port or district consists of a judge and two assessors. Persons who may be summoned to sit as judge consist of wreck commissioners, stipendiary or metropolitan police magistrates, county court judges, and other fit persons. The assessors are persons of nautical, engineering, or other special skill or experience.

Part VII. deals with the delivery of goods. The shipowner who imports goods from foreign ports may, if the owner of the goods fails to do so, make the entry required by the Custom House, and land the goods any time after the time for delivery; or if there is no time fixed, then within seventy-two hours of the report of the ship. The goods may be placed in the custody of a wharfinger or warehouseman, with notice of the lien claimed for freight and other charges; and if the owner does not discharge the lien, or make a deposit of the amount claimed, the

goods may be sold.

Part VIII. deals with the liability of shipowners. A shipowner is not liable to make good any loss or damage happening without his actual fault or privity (1) when any goods are lost or damaged by fire on board the ship; (2) when gold, silver, diamonds, watches, jewels, or precious stones, not having been declared in writing, are lost or damaged by reason of any robbery, embezzlement, making away with, or secreting thereof. A shipowner's liability for damages for loss of life or personal injury on board his ship, or on any other vessel if caused by the improper navigation of his ship,

is limited to an aggregate amount of £15 per ton of his ship's tonnage; and in the case of loss or damage to goods under similar circumstances, to £8 per ton.

As to Parts 1x., x., and xI., which deal with wreck and salvage, pilotage and lighthouses, see articles on WRECKS, SALVAGE, PILOTS, and LIGHTHOUSE.

Part XII. deals with the mercantile marine fund. This fund is applicable for the salaries and other expenses of local marine boards, mercantile marine offices, and other expenses, and to it are paid fees and dues payable under the act, and a subsidy from Pailiament.

Part XIII. deals with legal pro-

ceedings.

Part XIV. confers upon the Board of Trade a general power of superintendence of merchant

shipping.

Merchant Taylors' School, Charterhouse Square, London, was originally founded in Suffolk Lane in 1561 by Sir Thomas White and the Merchant Taylors' Company, which is still the governing body. In 1875, on the transference of Charterhouse School to Godalming, a removal was made to the present building, which has accommodation for 450 pupils.

Mercia, ancient Anglian kingdom, occupying the central part of England between Northumbria on the N. and Wessex on the S.; E. Anglia was on its E. border and Wales on its w. Founded about 582, it was independent and occasionally powerful, espe-cially under Penda (626-655), and Offa, the builder of the famous dike on the Welsh border (757-795), till it merged, about 827, in the kingdom of Wessex.

Mercié, Antonin (1845), French sculptor, born at Toulouse; won the Prix de Rome (1868). In 1874 his Gloria Victis in bronze was purchased by the state. Other notable sculptures by him are William Tell (1892), at Lausanne; the funeral monument of Thiers, in the Père la Chaise cemetery

in Paris (1893); and Jules Ferry (1896), at St. Dic. Mercier, Honoré (1840-94), Canadian statesman, was born at Quebec. He was admitted to the

bar in 1867, and became editor of Le Courrier de St. Hyacinthe (1862-4 and 1866). He represented Rouville in the Dominion Parliament from 1879 onwards. and formed an administration and became attorney-general in 1887.

Mercuric and Mercurous Salts. See MERCURY.

Mercurius, in Roman mythology, the god of commerce and traffic generally; he was identi-fied with the Greek Hermes. A temple was built to him at Rome in 495 B.C.

Mercury, the planet nearest to the sun, revolves at a mean distance from it of 36 million



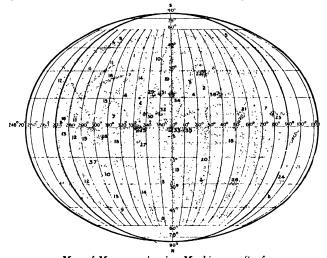
1. The Earth. 2. Mercury, same scale.

miles, in a period of 88 days. owing to the eccentricity of its orbit (e=0'205), the planet receives more heat at perihelion than at aphelion in the proportion of 9:4, and its velocity ranges from 23 to 36 miles a second. It rotates on an axis nearly perpendicular to its or-bital plane, which is itself in-clined 7° to the plane of the ecliptic. The periods of rota-tion and revolution are identical; hence the planet turns, apart from the effects of libration, always the same face towards always the same nee towards the sun. The inequalities of its motion, however, render these effects considerable, so that two marginal zones, each 23° 40′ in width and each illuminated once in a revolution, are appended to the normally sunlit hemisphere. The diameter of Mercury is about 3,000 miles; and its maximum elongation from the sun being 28°, it can only be seen after sunset or before sunrise, when it shines as a dull white star brighter than Arcturus. With a telescope, it is observed to be crescent or gibbous, and faint, rift-like markings on the disc are visible under advantageous conditions. The presence of an atmosphere is doubtful (Lowell). Transits of Mercury can only take place in May or November. The interval between two at the

served was by Gassendi (Nov. 7, 1631); the last of the 19th century occurred Nov. 10, 1894; and the next is anticipated for Nov. 12, 1907. The perihelion of Mercury was found by Leverrier to progress faster than theory prescribed by 38" in a century; but the intra-Mercurian planets, imagined for reconcilement of the discrepancy, have no ascertainable existence.

Mercury, or QUICKSILVER (Hg, 200'0), is a metallic element that is liquid at ordinary temperatures. It occurs free in

phur is oxidized to sulphur dioxide and mercury is set free, $HgS + O_2 = SO_2 + Hg$. The mercury vapour given off is condensed in cooled pipes or chambers, the product being purified by filtra-tion through wash-leather, some-times followed by redistillation. Mercury is a heavy (sp. gr. 13.6), silver-white, shining liquid; it solidifies to a malleable solid at - 40° C., and boils to a colourless vapour at 358° C. It is a fair conductor of heat and electricity, and has a regular coefficient of



Map of Mercury, showing Markings on Surface. d by permission on the drawing by Professor Lowell.) Ebu

	(Based by per
- Hypate.	11. Ebu
Zugon.	12. Corneu
Psychopompos.	13. Somnu
Lichanos.	14. Oneirope
Keras.	15. Psychag
6. Parhypate.	16. Aphoris
7. Mese. 8. Cornu.	17. Testudo.
9. Talaria.	18. Trite.
10. Plectron.	19. Hermes.

20. Kriophoros.
21. Mese meson.
22. Parhypate hypaton.
23. Mese hypaton.
24. Nete hypaton.
25. Paramese hypaton.
26. Nete meson.
27. Telta disassumman. Oneiropompos. Psychagogos. Aphorismos. Testudo.

27. Trite diezeugmenen. 28. Trite hyperbolæon.

- 29. Lichanos hyperbolæon.
 30. Mese hyperbolæon.
 31. Lichanos synemm
 32. Mese diezeugn
 33. Parameso meson.
 54. Lichanos meson.
 54. Lichanos meson.
 55. Paramese hypa. ...
 36. Lichanos hypaton.
 37. Paramete.

nature to a small extent, but its chief source is its sulphide, cinnabar, HgS. The principal





Telescopic Views of Mercury.

same node may be as short as seven, but is usually of thirteen or forty-six years. The first ob-

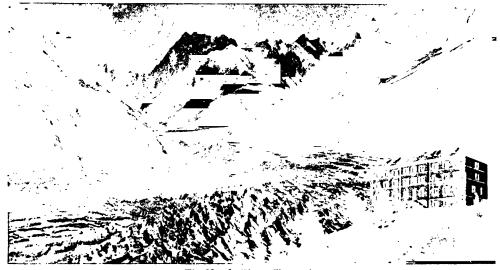
method of preparation consists in heating the cinnabar in a current of air, when the sul-

expansion. Mercury readily dissolves most metals, forming amalgams with them. It tarnishes but slightly in the air, except when heated to about its boilingpoint, when it is slowly converted into its oxide, HgO, a red powder, from which oxygen is again set free at a higher temperature. Mercury two classes of salts—viz. the mercuric salts can be derived from the above oxide by solution in acids, and are, in general, soluble in water. The most important of them is mercuric chloride, or corrosive sublimate, HgCl₂, prepared by subliming a mixture of common salt and mercuric sulphate; like the other mer-curic salts, it yields a black precipitate of mercuric sulphide when acted on by hydrogen sulphide. Mercuric sulphide is also obtained by direct union of

the metal and sulphur, and when sublimed changes to a bright scarlet form, which is used as a pigment under the name of vermilion. Of the mercurous salts, mercurous chloride, or calomel, Hg₂Cl₂, is typical, and is a white insoluble solid that is blackened by ammonia. Mercury is invaluable for scientific purposes, chiefly on account of its high density and high boiling-point, and as conducting electricity without undergoing change. Hence it is employed in barometers, manometers, pumps for attaining high vacua, thermometers, electrical connections and switches, and for a host of other purposes. It is also used largely as a solvent in extracting gold, for silvering mirrors, and both free and in

compounds—in particular, mercurous iodide—is in the treatment of syphilis, for which disease the drug is a direct antidote. Mercury compounds act as a violent irritant poison; and even medicinal doses, if persisted in for long periods, set up chronic poisoning, of which soreness of the mouth, looseness of the teeth, and copious secretion of the saliva are marked symptoms. Workers with mercury are also affected with nervous troubles, exhibited by trembling and palsy.

Mercury, Doc's, the popular name of a poisonous herbaceous plant, Mercuriatis perennis, which is a native of the temperate parts of Europe and Africa. It belongs to the order Euphorbiaceæ, and male and female flowers are borne sequence of sixteen-line poems (so sonnet-like in appearance as frequently to be described wrongly as 'a sonnet sequence'), Modern Love, stands alone, in its kind, with its characteristics of poignant insight, of masterful beauty, and of distinction of style. Perhaps the name and influence of George Meredith stand for more, with the younger generation of men and women, than his actual achievement in literature; for he has, more intimately than any other, set forth certain ideals of life and conduct, and has, more intimately than any other, revealed women to women as well as women to men, and vice versa. Books such as Beauchamp's Career (1875), Harry Richmond (1871), and The Tragic Comedians (1880)



The Mer de Glace, Chamonix.

combination as a drug. Mercury itself, in a fine state of division and mixed with chalk, confection of roses, lard, and other diluents, is the active ingredient in the gray powder, blue pill, and mercurial ointment of the Pharmacopœia. Mercuric and mercurous chlorides and iodides, and many other preparations of the metal, are largely used in medicine. Of these, mercuric chloride is one of the most effective antiseptics known, and is largely used in solutions of 1 part to 1,000 of water; whilst mercurial ointments of various kinds are employed to destroy parasites and relieve itching. Internally, metallic mercury and calomel are purgative, and aid to a certain extent the excretion of bile; but perhaps the most valuable application of mercury

on different plants. Dog's mercury is a common British woodland plant.

Mer de Glace, much-visited Alpine glacier, 16 sq. m. in area, on the N. slope of Mont Blanc range, above the valley of Chamonix. Its flow in summer is said to be two feet per day.

Meredith, George (1828), English novelist, born in Hampshire. He never sought, and has never obtained, a wide popularity; but year by year his fame has steadily grown. Two at least of his novels have already taken an apparently assured place in English literature, and that place is with the highest—The Ordeal of Richard Feverel (1859), and The Egoist (1879). In verse, several lyrics and poems have won in contemporary poetry a place not less assured; and the great

have had much to do with the moulding of men's character and ideals; and books such as Diana of the Crossways (1885), The Egoist, and The Amazing Marriage (1895) have been a revolutionary factor in the evolution of contemporary social life in its most distinctive and significant phases. Before his twentieth year Mcredith had given himself to journalism. But the pen was a precarious staff, and his early years in London were years of privation and sometimes of hardship. Slowly, however, he won a position of some standing, though it was less by this than by the qualities of his mind and character that he impressed the few men of standing with whom he came in contact, and notably Thomas Love Peacock, to whom he owed much, in a literary sense as well as otherwise. For the last quarter of a century he has lived in Surrey, on the slope of Boxhill. He was appointed to the Order of Merit in 1905.

Meredith was twenty - three when he published his first book, *Poems* (1851). Although it is commonly stated that this volume received no, or but scant, atten-

war Meredith travelled in Tyrol and Italy as a correspondent; and it is to these experiences we owe the romances Emilia in England, now called Sandra Belloni (1864), and Vittoria (1866). Before these were published appeared the novel Evan Harrington (1861), and Modern Love, and Poems of the English Roadside,



George Meredith. From the portrait by G. F. Watts, R.A.
(Photo by Hollyer.)

tion, it was more or less sympathetically treated by some of the leading 'weeklies' and 'monthlies'—notably the Spectator and the Atheneum, the Edinburgh Review and Fraser's Magazine (the article in vol. xliv. of the latter was written by Charles Kingsley). At Weybridge, not far from Peacock, he wrote, during the spring and summer of 1855, The Shaving of Shagpat (1855), and later Farina (1857). About this time he incurred heavy financial losses. It was at this juncture, and in the face of many difficulties (known only to intimate friends), that he wrote The Ordeal of Richard Feverel (1859). At the period of the Austrian

with Poems and Ballads (1862)
— Modern Love reissued, with
The Sage Enamoured and other
poems, in 1892. In 1865 Rhoda
Fleming appeared. With the
issue of The Adventures of Harry
Richmond in 1871, and five years
later (1876) of Beauchamp's Career, Meredith's third and greatest period begins, if we may use
the phrase of a division that
separates Richard Feverel and
Modern Love from his highest
achievement. In 1879 The Egoist
won for him the supreme place
as a writer of English high comedy in prose fiction. Thereafter
appeared The Tragic Comedians
(1880): Diana of the Crossways
(1885); One of our Conquerors

(1891); The Tale of Chloc, The House on the Beach, and The Case of General Ople and Lady Camper—reprinted from the New Quarterly Magazine of July 1879 and January and July 1877 (1895); Lord Ormont and his Aminta (1894); The Amazing Marriage (1895); and, in 1897, An Essay on Comedy and the Uses of the Comic Spirit. The poetry of this middle and later period comprises Poems and Lyrics of the Joy of Earth (1883); Ballads and Poems of Tragic Life (1887); A Reading of Earth (1888); Jump to Glory Jane (1892); Poems: The Empty Purse, with Odes (1892); Selected Poems (1900); Odes in Contribution to the Song of French History (1898); Nature Poems (1898); a Reading of Life (1901); and Short Stories (1902). Since 1898 have also appeared the revised and complete edition in 32 vols, and the new popular edition in 16 vols. See Monographs by Lynch (1891) and Jerrold (1902), and The Poetry and Philosophy of George Meredith, by G. M. Trevelyan (1906).

Meredith, Owen. See Lytton.

Meredith, OWEN. See LYTTON. Merendera (a name given to Colchicum by the Spaniards), a genus of hardy liliaceous plants, mostly natives of S. Europe. Many species are grown in gardens, and are easy of culture.

Meres, Francis (1665-1647), English writer, born in Lincolnshire. He became rector of Wing in Rutland in 1602. He contributed apothegms to Policuphuia: Wit's Commonwealth (1597), principally the work of Nicholas Ling, Meres's continuation being Palladis Tamia: Wit's Treasury (1598), Wit's Theater (1599), and Palladis Palatium (1604).

Merewether, post tn., co. Northumberland, N.S.W., Australia, 32° 58′ s., 151° 42′ E. Has coal-mining. Pop. (1901) 4,551.

Merganser, a name given to certain sea-ducks of the genus Mergus. The common British species is the red-breasted merganser (M. serrator), which breeds in the Highlands of Scotland and in Ireland. The drake is a hand-



Merganser.

some bird with a glossy green head, bearing a long filamentous

crest, a white neck with a black band, and a reddish breast streaked with black, while the back and upper surface are chiefly black with white markings. The female is more soberly clad. The bird is usually found in the sea, except at the breeding season, when it haunts inland waters. The nest is placed among heather or brushwood, or sometimes at the end of a hole in a bank. The bird has a wide range over the northern hemisphere. The hooded merganser (M. cucullatus) of N. America has been occasionally recorded in the British area.

Mergui. (1.) M. ARCHIPELAGO,

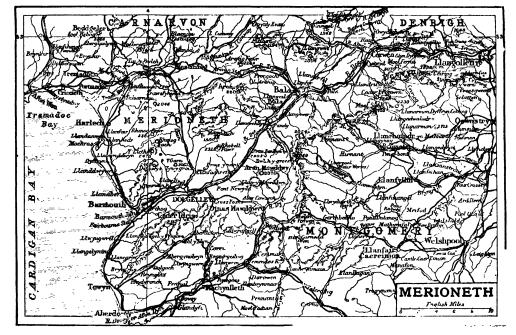
Mergui. (I.) M. ARCHIPELAGO, in Bay of Bengal, off Tenasserim, Burma. The islands are peopled of a bishop, and possesses a university. Pop. 11,000. (3.) Capital of Yucatan, Mexico, 94 m. N.E. of Campeachy, with a 16th-century cathedral. Pop. (1900) 34,630.

Maridan city New Hayen of

Meriden, city, New Haven co., Connecticut, U.S.A., 18 m. s.w. of Hartford. It manufactures chiefly plated and Britannia warc. Pop. (1900) 24,296.

Meridian, CELESTIAL, a great circle of the heavens marking the intersection of the plane of the terrestrial meridian with the sphere. It may also be described as the vertical circle passing north and south through the poles, or as the hour-circle crossing the zenith. Astronomical observations 'of precision' are

du Règne de Charles IX. (1829), his most famous historical novel, were followed by Colomba (1830), a story of Corsican vendetta, and from 1830-40 by a series of works of fiction in the Revue de Paris. Later he contributed voluminously to the Revue des Deux Mondes. He also published accounts of his travels in France and elsewhere, as Letters from Spain (1840). La Guerre Sociale (1841), Catalina (1844)—preludes to an unwritten life of Cæsar—Don Pèdre (1843), Faux Démétrius are his best historical works. He translated some notable Russian books; and Carmen (1847) afforded an operatic theme to Bizet. The much-discussed Lettres



by Silongs, whose chief occupations are pearl-fishing and the collection of bêche de mer and edible birds' nests. (2.) Seaport and cap. of Mergui dist., Lower Burma, on an island about 2 m. from the mouth of the river Tenasserim. Exports timber and rice. Pop. (1901) 11,987.

Merida. (1.) Augusta Emerita), city, S.W. Spain, prov. Badajoz, on r. bk. of Guadiana, 34 m. by rail from Badajoz. It possesses many Roman remains, such as Trajan's triumphal arch, ruins of an amphitheatre, pillars of the great aqueduct, and temple of Diana. Pop. (1900) 9,124. (2.) Capital of state of Los Andes, Venezuela, in valley of the Chama. It is the residence

commonly made in the meridian, since effects of refraction and parallax are there at a minimum. For the terrestrial meridian, see SURVEYING.

Meridian, city, Mississippi, U.S.A., co. seat of Lauderdale co., 125 m. N.w. of Mobile. Its leading industry is cotton manufacture. Pop. (1900) 14,050.

facture. Pop. (1900) 14,050.

Mérimée, Prosper (1803-70),
French novelist and historian,
born at Paris; became a leader
in the romantic movement. His
first works, Clara Gazul and La
Guzla (1825), purported to be translations, respectively, of Spanish
comedies and Illyrian songs.
The former he never surpassed.
La Jacquerie (1828), a page of
feudal history, and La Chronique

a une Inconnue appeared after his death (1873-5), and appeared in an English translation, as The Love-Letters of a Genius, by E. A. S. Watt (1906). He became an Academician (1844). See Sainte-Beuve's Portraits Contemporains; Filon's P. Mérimée (1898); Chambon's Notes sur P. Mérimée (1903); and D'Haussonville's Prosper Mérimée (1888).

Merino, a Spanish breed of sheep, prized especially for the quality of the wool. See SHEEP.

Merionethshire, maritime co. of N. Wales, fronting Cardigan Bay for 40 m., with breadth of 29 m. and area of 665 sq. m. The Berwyn ridge, N.E., separates it from Denbighshire. It is very mountainous, Arran Mawddwy

(2,972 ft.), Cader Idris (2,949 ft.), and Arenig (2,800 ft.) being the chief peaks. The picturesque valleys include those of the Dee from Bala Lake, the Mawddach, and parts of the Dovey. Llyn Tegid, or Bala Lake (5 m.), N.E., is the largest natural lake in Walcs. Slate is quarried—c.y. at Festiniog; also limestone, and gold, copper, and lead are obtained. Festiniog is the largest town; Dolgelly, the central town. The county returns one member to the House of Commons. Pop. (1901) 49,130.

Meristem, a name given to that part of a plant's tissue which consists of groups of constructive, dividing, and changing cells, as distinguished from the so-called permanent tissue which is produced from meristem. The cells of meristem closely resemble one another, so that it is impossible to tell what form of permanent tissues will be produced by them. · Merivale, Charles (1808-93), English historian, born in London. He became rector of Law-ford, Essex (1848), Hulsean lecturer (1862), Boyle lecturer (1864-65), chaplain to the Speaker of the House of Commons (1863-9), and dean of Ely (1863). He wrote History of the Romans under the Empire (1850-64), Conversion of the Roman Empire (1864), Conversion of the Northern Nations (1866), a rhymed translation of the Iliad (1869), General History of Rome (1875), and Lectures on Epochs of Early Church History (1879). See his Autobiography, edited by his

Merivale, Herman Charles (1839-1906), English author, born in London. He was called to the bar (1864), but retired in 1874. He published poems and plays, of which the principal are All for Her (1874), The Umic (1882), Fedora (1883), Our Joan (1885), The Butler (1886), The Don (1888), and edited the Annual Register (1870-80). See his Bar, Stage, and Platform—Autobiographic Memories (1902), and Family Memorials, by Anna Merivale (1884).

daughter (1898).

Merivale, John Herman (1779-1844), English scholar and poet, was born at Exeter. He was called to the bar (1804), and employed on Chancery commissions (1824-31). He is best known by his translations of Schiller (1844) and his contributions to Bland's Greek Anthology (new ed. 1883). He wrote Poems (1838) and Orlando in Roncesvalles (1814), and edited a series of Reports of Cases in Chancery (1817-19). See Family Memorials, by Anna Merivale (1884).

Merle d'Aubigné. See D'Au-BIGNÉ.

Merlin (Falco æsalon), the smallest of British falcons, which

is found as a breeding species in Wales and the northern parts of England, Scotland, and Ireland.



Merlin.

It preys chiefly on small songbirds. The total length is eleven or twelve inches. The male is slaty blue, with the nape and under parts rufous; it is streaked with dark brown throughout. In the female the under surface is white, and the rest of the body dark brown, the tail being crossed by light bands.

Merlin, the wizard of Arthurian romance, was of Welsh origin and mystic birth, and played a part at the court of Vortigern (or of Uther-Pendragon), and a still more important part at that of King Arthur. From the 12th century onwards he was famous as the reputed author of prophecies concerning the destinies of England-Prophetia Merlini; see T. Heywood's Life of Merlin, his Prophecies and Predictions (1641; new ed. 1813). There were also two other popular books about him from about the same period -Vita Merlini, in Latin hexameters (ed. 1837); and Roman de Merlin, in prose, by Robert de Borron (ed. G. Paris, 1888). Merlin figures, of course, in Malory's Le Morte Arthur and in Tennyson's Idulls of the King. There is a Scottish counterpart to him called Merlin Caledonius, said to have lived in the 6th century, and to have perished in the Tweed at Drummelzier. There is a Life of him published by the Roxburghe Club in 1833.

Mermaids and Mermen.
Oannes or Hea, the fish-god of
the Chaldaco-Babylonian religion,
worshipped subsequently as Dagon in Palestine, and identical
with the Greek Noreus, is pictured with the upper half of the
body quite human, while the

lower half is that of a fish. Similar figures occur in ancient, mediaval, and later art. This curious belief may be explained as a personifying of the power of the sea. Or, again, the accounts of seals and other marine animals may have originated an idea that the sea contains many half-human creatures. There remains the cuhemeristic solution. Nereus is often portrayed as entirely a man. Oannes, who is said to have brought civilization to Babylonia, is sometimes figured as quite human, but dressed in fish-skins, according to Berosus, and as represented in an image found at Nimrud by Layard. Many stories of sea-women and sea-men resolve themselves into descriptions of a race like the Eskimos, who, when in their skin kayaks, appeared to carly voyagers like scals standing breasthigh out of the water.



Figure of Oannes, found at Nimrud.

Mermaid's Gloves, a name sometimes applied to Chalina oculata, a sponge not uncommon off British shores.

Mermaid's Purse, the name commonly given to the peculiar purse-shaped capsules in which skates, dog-fish, and their allies enclose their eggs. The young fish splits open the purse when its development is completed.



Mermaid's Purse.

In many instances the purses are furnished with long tendrils, by means of which the whole structure is moored to weed on the sea bottom. See SKATE

Mermaid Tavern was situated in Bread Street, Cheapside, London. It is mentioned in Expenses of Sir John Howard (1464). Here (c. 1603) Raleigh founded the famous club of which Shakespeare, Jonson, Beaumont, Fletcher, Selden, Donne, and others were members. The wit (see Fuller's Worthies) and the Canary wine were alike celebrated.

Merodach-Baladan, or Mar-DUK, king of Babylon (721-709 B.C.); made alliances with the rulers of Elam, and sent presents and ambassadors to Hczekiah, king of Judah. After a nine years' contest against Sargon, king of Assyria. Babylon was

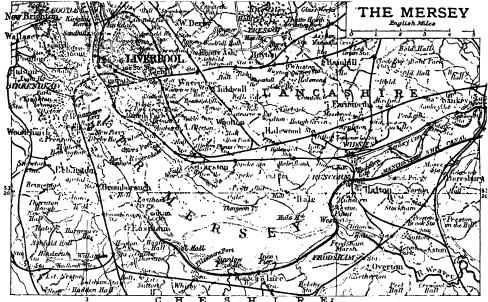
Merovingians, or MERWINGS, first dynasty that ruled in France after the fall of the Roman empire. It was founded by Clovis (481-511), the grandson of Merovig, and in 752 was succeeded by the Carlovingian dynasty. See FRANCE-History.

Merrill, cap. of Lincoln co., Wisconsin, U.S.A., on l. bk. of Wisconsin R., 170 m. N.W. of Milwaukee; has lumber trade. Pop. (1900) 8,537. 'Merrimac.' See HAMPTON

ROADS, BATTLE OF.

Merrimack, riv., U.S.A., rising in New Hampshire, and flowing S. and E.N.E. through N. of Massachusetts to the Atlantic. Merseburg, tn., Saxony, Germany, on l. bk. of Saale, 9 m. by rail s. of Halle, is specially noted for its cathedral (11th century) and its 15th century castle, from 1656 to 1738 the residence of the dukes of Sachsen-Merseburg. Leather, machinery, and toys are manufactured. Here a victory over the Hungarians was won by Henry the Fowler in 933. Pop. (1900) 19,118.

Mersey, English riv., rises in erbyshire. From Stockport, Derbyshire. where it is joined by the Tame, it winds W. between Lancashire and Cheshire, receiving the Irwell from Manchester. Below Runcorn it expands into a large



Bartholo

captured by the latter and razed to the ground. In 705 B.C. Merodach - Baladan was finally expelled from his throne by Sargon's successor, Sennacherib.

Meroë, dist. of ancient Ethiopia, almost surrounded by two tributaries of the Nile, the Astabus (Bahr-el-Azrek) and the Astaboras (Atbara); it now forms part of the Sudan. Its chief town, also called Meroë, became at an early date the capital of an

important state.

Merom, WATERS OF, the modern Lake Huleh, the most northerly of the chain of lakes traversed by the river Jordan. It was the scene of the great battle between Joshua and the kings of Canaan (Josh. 11:5). Length, 4½ m.; breadth, 3½ m. Meropidæ. See BEE-EATER.

Its course is interrupted by rapids and falls, from which power is obtained for cotton spinning. Length, 150 m.; drainage area, 4,864 sq. m. It is navigable to Haverhill, Massachusetts (18 m.).

Merriman, HENRY SETON (c. 1863-1903), non de plume of Hugh Stowell Scott, British novelist. He was an underwriter at Lloyd's, but about 1892 finally adopted the career of literature. Among his works are From One Generation to Another (1892), The Slave of the Lamp (1892), The Sowers (1896), The Money Spinner (1896), In Kedar's Tents (1897), Roden's Corner (1898), The Isle of Unrest (1900), The Velvet Glove (1901), The Vultures (1902), Barlasch of the Guard (1903), and The Last Hope (1904).

Merscheid. See Ohligs.

Notwithstanding estuary. entrance bar and shoals, the river ranks next to the Thames in commercial importance. The Manchester Ship Canal joins it near Irlam. A transporter bridge connecting Runcorn with Widnes was opened in 1905.

Mersina, seapt., in vilayet Adana, Asiatic Turkey, on the Levant, 36 m. by rail ws.w. of Adana. It is surrounded by fine gardens, and has an open roadstead as harbour. Exports wool and cotton. Total trade annually, about £1,000,000. Pop. 12,500.

Mertensia, a genus of hardy herbaceous plants belonging to the order Boraginaceæ. Many are of garden value, and all are easily grown. The Virginian cowslip (M. virginica) bears terminal racemes of tubular flowers.

Merthyr-Tydfil, mrkt. tn. and parl. bor., Glamorganshire, Wales, on Taff R., 23 m. N.w. of Cardiff. Since the middle of the 18th century it has grown because of its abundance of coal and iron. Brewing and flannel-weaving are minor industries. Adjoining, and forming part of the borough, is the eccles. par. of Dowlais, with large iron works. The borough returns two members to the House of Commons. A charter of incorporation was granted in 1905. Pop. (1901) 69,227; of parl. bor., including Aberdare (5 m.) and Gelligaer, 122,536.

Merton, par. and metropolitan suburb of London, Surrey, 8 m. s.w. of Westminster. Pop. (1901)

4,501.

Merton, WALTER DE (d. 1277), bishop of Rochester, born probably at Merton in Surrey. He became lord chancellor in 1261, and bishop of Rochester in 1274. He founded a hospital at Basingstoke and Merton College at Oxford. See Hobhouse's Walter de Merton (1859).

Meru, mt., German E. Africa. 40 m. w.s.w. of Kilima-Njaro, consisting of two peaks, 14,600 and

12,100 ft. respectively.

Merv, tn. and oasis, Transcaspian prov., Russian Central Asia, 192 m. s.w. of Bokhara, in a depression of the Murghab valley. The cultivated area of the oasis covers 1,480 sq. m. The principal crops are wheat, melons, water-melons, barley, rice, cotton, sesame, and millet. Dust storms are constant, especially from w. and s.w. Pop. (mainly Tekke Turcomans) 160,000. Merv is one of the most venerable of Asiatic cities, being mentioned in the Zendavesta. As Antiochia Margiana it was partly refounded by Alexander the Great, and Scleucus Nicator planted a col-ony here. From 334 Christian bishops appear; and from the 6th to the 9th century Nestorian Christianity was powerful, perhaps dominant, in Merv. Under the Arab caliphs (from 666 A.D.) and Seljuk sultans (from c. 1040) it rivalled Bagdad (Alp Arslan and Sanjar were buried here); but in 1153 it was sacked by the Ghuz Turks, and in 1221 destroyed by the Mon-gols. It was a Persian city from 1512 till 1795. The Russians 1512 till 1795. The Russians occupied it in 1884. The ruins of old Merv are mostly at Bairam Ali, 18 m. E.N.E. of the modern Russian city, and include a Persian fortress destroyed in 1795, old fortifications of the Moslem period, the tomb of Sultan Sanjar, the buildings of Christian (Nestorian) Merv, and of the Greek (Seleucid) city. Pop. (1897) 8,727. See O'Donovan's The Merv Oasis (1882). Méryon, CHARLES (1821-68), French etcher, born at Paris, the son of an English physician. His etchings of the Paris streets are highly esteemed; the best known are Abside de Notre Dame, Rue des Maurais Garçons, and Stryge. Méryon died insane at Charenton.

Mesagne (anc. Messapia), tn., prov. Lecce, S. Italy, 12 m. by rail s.w. of Brindisi; trades in olive oil, grain, wine, and fruit. Pop. (1901) 12,161.

Mesdag, Hendrik Willem (1831-1905), Dutch marine painter, born at Groningen; began to study art at Brussels in 1866. He adopted the method of painting landscape on windows, and then enlarging the picture on canvas. In 1868 he discovered that sea painting was his vocation, and verified Sir Alma Tadema's pre-diction, 'Perhaps a Courbet, never a Meissonier.' He settled at the Hague in 1839, and set himself to interpret an idea of immensity and boundless space in sea and sky. His pictures are to be seen in the Hague Museum, Boyman's Museum, Rotterdam, and the Luxembourg, Paris.

Mesembryanthemum, agenus of fleshy, herbaceous plants be-longing to the order Ficoidacea. They bear conspicuous flowers and thick, fleshy leaves. Most of the species are natives of S. Africa, and require greenhouse They are easily grown, the two main desiderata being full exposure to the sun at all times, and a light, rather poor soil. Propagation is easily effected by pieces pulled off and laid on damp sand in full sunlight. Among the species are M. crystallinum, the ice plant, a pro-cumbent form with shining papules over its entire surface, which does well in the open in mild districts; and M. edule, the Hottentot fig, a prostrate shrub bearing yellow flowers in July.

Mesentery, an abdominal membrane attached to the lum-bar vertebræ behind and folded round the intestine in front. It consists of a duplicature of the

peritoneum.

Meshcheriaks, a race of E. Russia, of Ugro-Finnish origin, and related to the Voguls and Bashkirs, found mainly in gov-ernments Ufa and Orenburg ernments Off and Orenburg (where they are mostly Mussul-mans), of Kazan, Penza, Vyatka, Tambov, Ryazan, and Saratov (where they have generally adopted Russian religion, dress, manners, and language). Pop. about 160,000, of whom 125,000 are Mohammedans.

Meshed, or Mash-HAD, tn. N.E. Persia, cap. of prov. of Khorassan, 110 m. from Afghan frontier, and some 60 m. from Russian Transcaspian frontier. It is a famous place for pilgrimages, the attraction being the tomb of Imam Riza, son of Ali, founder of the Shiites, in a magnificent and richly-adorned mosque. Its trade, once considerable, has decreased since the completion of the Russian railway from the Caspian to Samarkand. Fine silks, carpets, shawls, and sword blades are

manufactured. Pop. 60,000.

Mesitylene, or symmetrical tri-methyl benzene, C₆H₃(CH₃)₃, is an aromatic hydrocarbon occurring in coal tar, and best prepared by distilling acetone with sulphuric acid. It is a pleasant-smelling liquid (b.p. 164'5 c.; sp. gr. at 9'8°, '869), which, when heated with dilute nitric acid, yields acids by the successive oxidation of the methyl groups.

Mesmer, FRIEDRICH FRANZ or ANTON (1733 1815), German phy-sician, founder of the theory of animal magnetism or mesmerism, was born at Iznang, near Lake Constance. In 1766 he published De Planeturum Influxu, a treatise designed to show planetary influence on the human nervous system. About 1771 he began to study magnetism as a curative method, and in 1775 published Ucber die Magnetkur, and opened a school or hospital in Vienna. Being driven from there, he went to Paris (1778), where for a time he was very successful. At length the government appointed a committee of the Academy of Sciences to investigate his discoveries: the result was unfavourable to Mesmer, who returned to Germany, and died in obscurity. See Carpenter's Mesmerism and Spiritualism (1877); Kiesewetter's F. A. Mesmers Leben und Lehre (1893); Graham's Mesmer the Magnetiser (1890).

Mesmerism. See HYPNOTISM. Mesne Process. Process is another term for execution of the judgment of a court. It is either original, mesne, or final, according as it issues at the beginning, middle, or end of an action. Arrest on mesne process was abolished by the Judgments Act, 1838, except in the case of

Ne exeat regno.

Mesne Profits. The action of mesne profits is an action of trespass brought to recover profits derived from land, whilst the possession of it has been wrongfully withheld. In estimating the value of the mesne profits, the yearly rent paid is generally used as the measure of value. Formerly this action could not, except in cases of landlord against tenant, be joined with an action of ejectment; but since 1883 the action can be joined with an action for the recovery of land.

Mesoderm, the name given by embryologists to the third or

middle layer, which appears in development after the ectoderm and endoderm, and which gives rise to the whole of the connective tissues, the excretory system, the blood-vessels and blood, the reproductive organs, as well as lining the body-cavity through-Many embryologists now out. deny that there is a middle layer in anything like the same sense that there is an outer and inner

layer. See EMBRYOLOGY.

Mesopotamia, 'the country between the rivers' Euphrates and Tigris (Gen. 24:10; Deut. 23:4; etc.). Properly it did not include the whole district, but extended N. as far as a branch of the Taurus Mts., and s. as far as the Median wall, a little N. of Babylon. It was also called Aram-Naharaim, and in the Old Testament Padan-aram. It was the original home of the Hebrews (Gen. 11; Acts 7: 2); there Isaac obtained his wife Rebekah (Gen. 24: 10, 15); there Jacob also obtained his wives (Gen. 28: 2-7), and there most of his sons were born (Gen. 35: 26: 46: 15). It was the seat of the empires of the Assyrians, Babylonians, Syrians (successors of Alexander the Great), and Arabs.

Mesozoa, a group of small animals whose position in the animal kingdom is still uncertain. An example is Dicyema, found parasitic in cuttles. The body consists of an outer layer of ciliated cells, enclosing a single cell which contains many nuclei. Within this inner cell germs develop, and form the young, which are dimorphic. Even simpler is an apparently related form called Salinella, in which the body consists only of a single layer of cells. This form is not parasitic, but has been found in brine. While their origfound in brine. While their original discoverer, Van Beneden, regarded these forms as intermediate between Protozoa and Metazoa, more recent observers have suggested that they may be degenerate Platyhelminthes.

Mesozoic, a subdivision of geological time, between the Permian and the Eocene. It includes the Triassic, the Jurassic, and the Cretaceous systems. Mesozoic rocks cover much of England, France, N. Germany, Austria, the Northern Alps, and the centre of N. America. Volcanic rocks are not represented among them in any numbers. At a later stage Mesozoic rocks were elevated to great heights in the Alps, the Himalayas, and the Rocky Mts. The flora and fauna were characterized by the rise and culmination of the Ammonites, which began to be of importance in the Trias, and became extinct before the beginning of the Eocene. It was also the period of the great reptiles. Mammals were in existence during almost the whole period, but were small and unimportant. Birds came into existence in Jurassic times, but flying reptiles also peopled the air. The earlier also peopled the air. The earlier part of the period had a flora mostly of cycads, conifers, and ferns, but flowering plants became important in the Cretaceous.

Mespilus, a genus of hardy deciduous trees belonging to the order Rosaceæ. They bear large white flowers followed by turbinate pomes. M. germanica is the common Medlar.

Mess, in the army, every body of officers or men who feed collectively, and whose boarding expenses are kept in a common account. There are generally in British units an officers' mess, a sergeants' mess, and a number of messes for the rank and file. All the officers must be members of the mess of their unit. The unmarried officers present at head-quarters regularly dine together; the married officers need dine only when they wish to do so, but must do so when their wives and families are away from the station. The officers' mess-house is provided by government, and usually contains a mess-room, an antercom, and a billiard-room, besides a kitchen, cellars, and other offices. The government also finds a small part of the furniture; but all the rest, with plate, china, glass, etc., is the property of the mess itself. The mess is managed and its accounts kept by a committee of three officers. Every officer on joining a corps pays an entrance fee, and afterwards an annual subscription; the government also makes a small yearly allowance. Mess-bills are paid monthly. The officers' mess also partakes of the nature of a club, and mess meetings are held once a quarter. The commanding officer is responsible for the proper administration of the mess, and the senior officer present is responsible for the maintenance of dis-

cipline.
The sergeants' mess is for the warrant officers and non-commissioned officers above the rank of corporal. It is organized and managed on the same principles as the officers' mess. Liquor consumed is not put into a member's mess-bill, but is paid for in cash as served. The amount of the bill is charged monthly in the member's accounts and settled by the officer commanding his squadron, company, or battery. A sergeant assists the committee of three non-commissioned officers

as caterer.

The messing of the rank and file (corporals and privates) is managed under the superintendence of their officers by the coloursergeants of companies in the infantry and corresponding noncommissioned officers in the other branches of the service. company or similar sub-unit really forms but one mess so far as accounts and management go; but the men occupying each room are often spoken of as a mess. The bread and meat rations are issued daily by the government contractors, each issue being inspected by an officer. Married men are given their own rations. To supplement the bread and meat ration, each man contributes 3d. a day, while in most corps a further contribution towards each company's messing is made from the canteen fund. All provisions other than rations are bought, as far as possible, by or through the canteen. There are three meals a day-breakfast, dinner, and tea; these are caten in the barrack-rooms. No liquor is provided, but those who desire it can have beer from the canteen with their dinner on payment. Every regiment of cavalry and battalion of infantry has a ser-geant-cook (trained in the School of Cookery at Aldershot) for general superintendence and instruction. Each company in the infantry (or corresponding subunit in the other arms) has a man of the company as standing cook.

Messageries Maritimes, the principal passenger steamship line in France; it carries the mails to Italy, Egypt, Syria, the Levant, Greece, India, and China. It also includes a service to Australia and S. America, Mediterranean, Black Sea, and Danube ports, as well as to the S.E. coast of Africa. 1t possesses (1905) a of Africa. It possesses (1993) a fleet of 76 steamers, aggregating 286,521 tons. Nine vessels have a speed of 17 knots.

Messala, Roman family of the Valerian clan; its most distinguished member was Marcus Valerius Messala Corvinus, who fought with Brutus and Cassius against the triumvirs at Philippi in 42 B.C., but afterwards became one of Augustus's chief generals and friend. At Actium he commanded the centre of the fleet. He was consul in 31 B.C., and proconsul of Aquitania in Gaul in 28 and 27 B.C. He was also a generous patron of literature, and himself wrote works on history and grammar, as well as poems and speeches.

Messalina, VALERIA, the daughter of M. Valerius Messala

Barbatus, was the third wife of the Roman emperor Claudius I. All the writers of the period represent her as a monster of cruelty and profligacy. Having complete influence over the weak Claudius, she caused many distinguished

persons to be executed, sold military and provincial mands, intimidated the comcourts, and put her favourites into any post she chose. Narcissus, the freedman of Claudius, feeling his own position insecure, at length disclosed to Claudius Meswith Gaius salina's adultery Silius, and persuaded him that Messalina meant to deprive him of life and empire. Claudius ordered her death, and she was killed by a soldier in the gardens of Lucullus. She left two children by Claudius, Britannicus and Octavia.

Messene. See Messenia. Messenia, dist. in ancient Greece, forming the s.w. portion of the Peloponnesus. It was conquered by the Spartans in the 8th and 7th centuries B.C., and the Messenians were made helots. In 464 B.C. they revolted, and for five years resisted the power of Sparta; finally, in 459, their fortress Ithome was captured; but many of the Messenians were allowed to leave their country, and settled at Naupactus in Ætolia. Nearly a century later, Epaminondas restored the Messenians to independence, and founded the town of Messene at the foot of Mount Ithome (369 B.C.).

Messiah (Gr. Christos), a per-

sonage whom the Israelites ex-pected to come as the divine agent in their delivery and triumph. The national hope clothed itself in many forms-c.y. clothed itself in many forms—c.g., a 'prophet like unto Moses' (Deut. 18:15), a 'prince of the house of David' (Isa. 9:6, 7), the 'suffering servant' (Isa. 52:13–53:12), 'one like unto a son of man' (Dan. 7:13); and the remarkable way in which these various aspects were fulfilled in Legis scent to justify His claim. Jesus seem to justify His claim, and the judgment of His followers, that he was the Christ (John 4:25 f.; Matt. 16:16). In Isa. 45:1, the title 'anointed' (messiah) is given to Cyrus. See CHRIST, JESUS CHRIST; James Drummond's The Jewish Messiah (1877); Stanton's The Jewish and the Christian Messiah (1886).

Messina. Messina. (I.) Province of Italy, in N.E. of Sicily; area, 1,245 sq. m. It produces corn, flax, lemons, oranges, wine, oil, silk, sulphur, and copper. It is traversed by mountain chains (Monte Sori, 6,055 ft.). Pop. (1901) 543,809. (2.) Town and archiepiscopal see, cap. of the above, on the strait of Messina, 114 m. by rail N. of Syracuse. The streets are regularly built and are paved with lava. The cathedral was with lava. The cathedral was commenced in 1098; the church of Sta. Annunziata dates from the Norman period. The university (1549) contains a valuable library collected by the Jesuits, and has 600 students. The chief

manufactures are silks, muslin, linen, and coral ornaments. The principal exports are wine. oranges, lemons, almonds, liquorice, and pistachios. Originally known as Zancle, the town was taken in 493 B.C. by Anaxilas of Rhegium, who called it Messene. Having been alternately in the possession of the Athenians, the Carthaginians, and the Mamertines, and having proved the cause of the first Punic war, it flourished under the Romans, whom it served as a station for their fleets. In 829 Messina was their neets. In OZU MICESINE was taken by the Saracens, who, in turn, were expelled by the Normans in 1072. The town suffers periodically from earthquakes. Pop. (1901) 147,106. (3.) STRAIT or (anc. Mamertinum Fretum or Fretum Siculum), 19 m. long, and from 21 m. to 14 m. in breadth. separates Sicily from Italy. The channel is very deep, and a strong current flows through it. The dangers to navigation are allegorized in the Scylla (a rock off ized in the Scylla (a rock off Italian coast) and Charybdis (a whirlpool opposite the harbour of Messina) of the Odyssey.

Mestre, tn., prov. Venice, N.
Italy, on a lagoon, 6 m. N.W. of

Venice. It has sawmills and foundries. Pop. (1901) 11,625.

Messuage, strictly a dwellinghouse with a small piece of ground attached; loosely used of any dwelling-house.

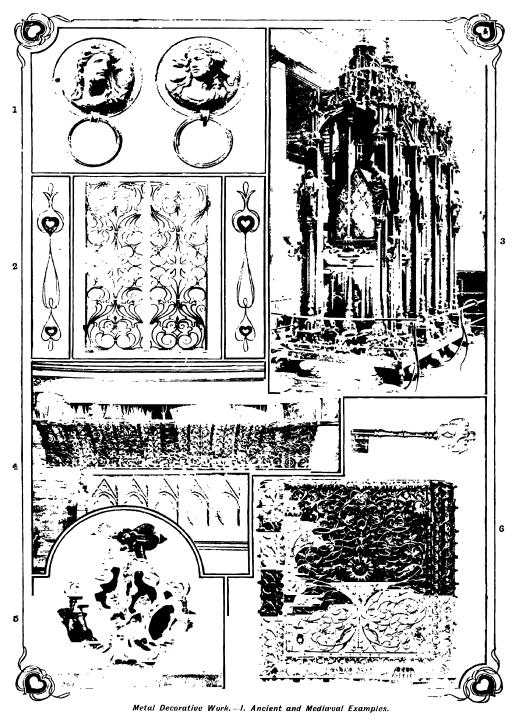
Metabolism. See Proto-PLASM and PHYSIOLOGY.

Metacentre of a floating body.

Metacentre, a point in a floating body whose position determines the stability or instability of the body. Imagine the body to be floating so that the upward resultant pressure of the water is exactly equal and opposite to the weight of the body acting through its centre of mass G, and let garded as drawn in the body. Now let the body be displaced by a slight rotation about a horizontal axis in the plane of flota-

tion. The line of action of the resultant upward pressure will no longer pass through c, and will consequently form with the weight of the body a combination of forces having a turning mo-ment upon the body. In order that this moment may tend to turn the body back towards its original position, it is evident that the line of resultant pressure in the displaced position must intersect the line AGB at a point above G. This point of intersection is the metacentre. When it is above the centre of mass, When the body is stable; when it is below, the body is unstable and will fall away more and more from the original position. Metal. Though metals are dis-

tinguished by the peculiar lustre which we associate with silver or copper, this property is not confined to them alone, for it is possessed by certain compounds such as sulphides, and by some elements like arsenic or graphite, which have but little claim to be called metals. Metals are in general of high specific gravity, are often ductile and malleable, conduct heat and electricity well, and are opaque; though these properties vary widely in the different cases. Thus potassium is lighter than water, bismuth is brittle and a poor conductor of electricity, and gold is trans-lucent in thin films. They differ also to very marked extents in fusibility and volatility. mercury is liquid at ordinary temperatures and boils easily, tin and lead are easily fusible, zinc can be distilled at a red heat, while iridium and chromium can only be melted, and most metals vaporized, at the highest attainable temperatures. table of constants in article on ELEMENTS.) Hardness is also a feature of great variability. In their chemical properties metals also differ much, but in general they are characterized by forming oxides of a basic character; though this is only true of the lower oxides, the higher oxides, like those of the non-metals, being acid. The metals may be classified as 'light' and 'heavy,' the light metals being subdivided into the alkali metals, such as potassium, the alkaline earth metals, such as calcium, and earthy metals, such as aluminium: the heavy metals include those similar to iron, those like copper. the noble metals, like gold, and the base metals, like antimony though these divisions often over-Alloys, or mixtures of metallic elements, such as brass or pewter, in which combination may have taken place to a greater or less extent, are also called metals. See METALLURGY, and ALLOYS.



1. Pair of bronze litter-handles; Greck, 3rd century a.c. (Waddesdon collection, British Museum.) 2. Gate of hammered fron; Italian, 17th century. (South Kensington Museum.) 3. Shrine of St. Sebald, Nuremberg, by Peter Vischer: 16th century. 4. Grille of Queen Elemon's tomb, Westminster Abbyy. 5. Bronze knocker, attributed to Giovanni di Bologar, Italian, 17th century. 4. Steel lock, pierced and engraved, by Walter Bickford; English, second half of 17th century. (Fitzheury collection, South Kensington Museum.)

Metal Decorative Work.—II. Modern Examples.

1. Cast iron lion, by Alfred Stevens, 2. Book cover in silver, by Miss M. Lilian Simpson. (From the facelable issued by the Art Union of Lot n.) 3. Cast lead pump (linet copper), by Sidney Lewis, (Made by Greege Wrazge, Ltd.) 4. Mayoral chain of Preston, by Alfred Gilb ., A.A. (Photo by Hollyer,) 5. Gates of the Adelphi Bank, Liverpool (now Lameschire and Yellier Bank), in east bronze, by W. D. C., .e; the scriptures by T. Stirling Lee. 6. Door plate, by Gilbert Bayes, (G. Wrazge, Ltd.) 7. Letter box, by Gilbert Bayes, (G. Wrazge, Ltd.) 8. Badge of the Art Workers' Guild, by G. Frampton, R.A. 9. Silver casket, by Alexander Fisher.

Metal Decorative Work. Gold and silver have been chiefly selected for the richest and most costly works of art in metal; but bronze, copper, tin, and lead have not lacked application in this direction also. Cast bronze for statuary was used from remote times in Egypt and in Greece; while in Britain, and more especially in Ireland, there were craftsmen skilled in the arts of bronze and metal working to a degree difficult for us to appreciate fully. Thus, the bronze shield with red enamel bosses found in the Thames, and now in the British Museum, gives some idea of the marvellous skill of its Celtic makers. Large cauldron-shaped pots of small plates of bronze riveted together are sometimes found in Ireland, and bronze bells and bell-cases of early date are by no means rare; weapons, shields, helmets, and horse trappings in bronze and enamels are also frequently met with. In the middle ages work in bronze, copper, bras, iron, lead, and tin reached a high level of artistic excellence. Armour and weapons of all kinds were often most elaborately decorated; while, in addition, large hinges extending over the whole surface of a door, locks, screens, grilles, and metal-work of all kinds were found in the cathedrals, churches, and monasteries

throughout Europe. The cast

bronze figures of Queen Eleanor,

Henry III., Edward III., Richard

II. and his Queen Anne, all in Westminster Abbey, and the wrought-iron screen above the

tomb of Queen Eleanor, are good examples of mediaval English

metal-work.

Abroad, work of great beauty may be seen in the shrine of St. Simeon at Zara in Dalmatia (Italian work of the 14th century), and the shrine of St. Sebald at Nuremberg, the work of Peter Vischer and his sons in the 16th century; while the bronze gates of the baptistery at Florence, by Lorenzo Ghiberti, mark the climax of the use of cast bronze for dec-orative purposes. The renaissance iron-workers in Europe were prolific in their output, and the art showed few signs of decline until the end of the 18th century. In England, the iron gates of the palace of Hampton Court are famous examples. Cast iron began to oust blacksmiths' work in the beginning of the 19th century. The productions in this material designed by Alfred Stevens are exceptionally good. The Greeks cast lead into beautiful forms for weights, and it has been used for urns and coffins from Roman times, many of these being highly ornamental. For statues it was frequently employed, especially

in connection with the gardens of the renaissance period and after; while in architectural work, roofs, finials, rain-water heads, and cisterns gave the lead-worker ample scope for his artistic skill. Pewter, a mixture of tin and lead, has also been much employed for decorative work, the objects often resembling the contemporary silver work, but with a bolder and less elaborate treatment, and being in domestic use as platters, flagons, and so forth, until superseded by earthenware.

237

The last twenty years has to some extent restored the metal-worker and blacksmith to their true positions as handicraftsmen, much of the work now being done bearing evidence of the best traditions of the art. See also Goldsmiths' Work, Silversmiths' Work, and Chasing; and for further information, consult J. Starkie Gardner's Iron Work (2 vols. 1893); F. S. Meyer's A Hundbook of Art Smithing (1896); J. Tijou's A New Booke of Drawings (1693; reprinted by B. T. Batsford, 1896); W. B. Scott's History and Practice of the Fine Arts (3rd ed. 1874); and W. R. Lethely's Lead Work (1893)

Lethaby's Lead Work (1893). Metallography, that branch of metallurgy which describes the structure of metals, mainly as discovered by microscopical examination. This study, in the main, owes its origin to Dr. Sorby, about 1864, and was extended in 1878 by Professor Martens, whose researches were followed by those of Professor Wedding of Berlin; Lynwood Garrison and Dudley of America; Barba, Osmond, and Werth in France; and notably in Britain by Arnold, Stead, Andrews, and Roberts-Austen. The specimen for examination is first carefully polished, and then etched by a suitable liquid. which exerts a differential action on the various structural constituents, revealing them by the diverse manner in which light is reflected from their surfaces. The polishing substances employed are different grades of emery, followed by rouge, or some powder equally soft, capable of producing a surface free from microscopic scratches. The polishing process may be hastened by the use of a machine worked by hand or by power; the most convenient hand machine is that of J. E. Stead of Middles-brough. In some cases polishing alone suffices to reveal the structure, because the various constituents tend to wear away unequally, according to their specific properties and absolute dimensions. To obtain the result, it is necessary to polish the metal on a bed elastic enough to wear away the little protuberances as they are formed, and delicate enough to

bring out the finest details. Osmond found parchment, stretched on soft wood, and moistened with wetrouge, the best. In other cases what is termed 'polish attack' is employed. This consists of adding to the polishing material some liquid that is slightly chemically active—e.g. ammonium nitrate solution or infusion of liquorice root for steels. Heattinting is also sometimes employed, the heat causing the constituents to become differently coloured by oxidation films.

Two kinds of illumination are used in viewing the structure of a metal under the microscope— oblique and vertical illumination. In the former, the microscope is generally tilted at an angle, and the light condensed on the object; for vertical illumination, a reflection or right-angled prism is arranged in the axis of the microscope, so as to reflect a beam of light normally to the plane of the object, which then reflects the light vertically up the tube of the microscope to the eye. It is advisable to record the appearances observed, photographically; the details of the processes employed are described in works on photo-micrography, such as that of E. J. Spitta. For full details of metallography, consult the original papers of the workers above mentioned, Harbord and Hall's Steel (new ed. 1905), and Hiorns's Metallography (1902).

Metallurgy includes the study of the processes of extracting metals from their naturally occurring sources, and their preparation in a suitable state of purity or admixture for use in the arts. Much exact knowledge has been obtained in recent years by the application of accurate methods of determining high temperatures, and by the microscopic study of the structure of metals and alloys; and the methods of preparation and manipulation have been greatly extended and simplified by the wider application of the process of electrolysis, and by the ready production of hitherto unattainable temperatures by means of the electric arc and the use of aluminium. Only a few of the metals occur in the native condition, such as gold, platinum, iridium, silver, mercury, and copper. In the great majority of cases they are found in combinations with non-metals, forming definite minerals; and their ores are those minerals from which the metals can be profit-ably extracted. The most usual ores are embedded in earthy matter, the 'matrix' or 'gangue, and may often be partially separated by mechanical operations, such as crushing, sorting, and washing; but the residue must

be removed by causing it to unite with a suitable flux during the subsequent furnace operations, and so form a slag, which is usually the waste product of the operation. If the impurity is silica, an oxide such as lime may be used as a flux, and vice versa, and the slag is the silicate formed, which, if it contains an excess of silica, is acid, and if an excess of oxide, it is basic. After the preliminary mechanical treatment, the ore is often further prepared by calcination or roasting, in which it is treated in a current of air to expel volatile matter, or to oxidize certain constituents without melting the mass. Sometimes chlorine takes the place of air, and chlorination instead of oxidation results. These operations and the smelting proper, which expresses the actual separation of the metal from its ore by various chemical actions while in a state of fusion, are carried out in furnaces, which are lined with fire-resisting material. See FURNACES.

Of the chemical actions taking place during smelting, the principal is an action of reduction, in which, as a rule, oxygen is removed from combination with the metal by the operation of a reducing agent, of which the chief are carbon, carbon monoxide, hydrogen, hydrocarbons, and sometimes metals. In some cases a regulus or matte, which is an artificial sulphide, is prepared as a preliminary, in order to prevent loss by the scorifying action of silicates during the removal of impurities. The sulphides are subsequently partially oxidized, so that, on heating with the unchanged sulphide, sulphur and the required metal are set free. A 'speise' is similar to a matte, but contains arsenic instead of sulphur. If the metal is volatile, and its vapour is led off and condensed to a liquid, as in the case of zinc or mercury, it is said to be 'distilled;' but if it is condensed as a solid, as in the case of arsenic, the process is termed sublimation.' In certain cases one or more constituents of a mixture may be separated by simple heating, in consequence of having lower melting-points than the rest. In this way argentiferous lead is largely separated from copper, and bismuth is liquated from its more infusible gangue. The term 'liquation' is also applied to the separation of any portion of a complex mixture, even when it is not removed from the main mass, as in the formation of eutectic alloys. 'Scorification' is the operation of oxidizing a metal in a clay dish or furnace, so as to form fusible oxides, mixed with some silicates from the silica of the clay, and forming a scoria or slag. In assaying, an excess of lead is used to form a fusible oxide, which has the power of dissolving otherwise infusible oxides. 'Cupellation' is a similar operation, performed in a vessel of bone-ash, termed a cupel, and has for its object the re-moval of base metals from gold and silver by oxidation and solution in oxide of lead. On the small scale, the liquid oxides are absorbed by the bone-ash, leaving gold and silver behind on the cupel. 'Amalgamation' is the union of mercury with other metals, forming amalgams; thus free gold and silver, being soluble in mercury, are extracted from their ores and products by grinding or crushing, followed by treatment with mercury, which is afterwards distilled off from the precious metals in the rich Some compounds, amalgam. either in a state of fusion or solution, are electrolyzed, as in the separation of aluminium or the purification of copper. Sometimes, too, the metal is set free in a 'wet' way, as in the wet copper extraction process, or the cyanide process of extracting gold.

A feature of great importance in the study of metals is their behaviour under stress of various kinds-thus, whether they are malleable, or capable of being extended laterally by blows or pressure; ductile, or able to be drawn into wire; tenacious, or brittle. In measuring the strength of a metal, it is usual to find the stress it can undergo without being permanently deformed, the strain that takes place up to that point, the amount of strain before rupture, and the maximum stress before rupture. In this and other respects, such as electric conductivity, the properties of metals are vastly influenced by the presence of even very minute traces of impurity, by the previous mechanical or thermal treatment, and by the actual temperature. Thus, the differences between wrought iron, mild steel, tool steel, and cast iron are ascribable almost entirely to the variation of the amount of carbon present from 0 up to 3 per cent. A metal like wrought iron is, at the temperature of liquid air, as brittle as glass, tough and hard at ordinary temperatures, and so soft and pasty at full red heat that it can be readily worked and welded. With regard to electric conductivity, the resistance is in general vastly increased by the presence of minute traces of impurity; on the other hand, lowering the temperature reduces the resistance to such an extent as to convey the idea that, if the absolute zero of temperature could be attained, the resistance would fall to zero, though at the very lowest temperatures this ceases

to hold good.

The metallurgist is also concerned with the machinery and methods of working metals. Thus, in some cases metals require to be rolled; in others forced, pressed, drawn, 'squirted;' some must be planed or otherwise cut; some can be joined by welding—i.c. pressing together in a pasty state; others require the intervention of a solder. See Roberts-Austen's Introduction to the Study of Metallurgy (5th ed. 1902, Blount's Electrochemistry (1901), and Longmuir's Elementary Practical Metallurgy (1905).

Metamorphism. A considerable part of the earth's surface is formed of rocks, which cannot be regarded as normal sediments or as igneous masses, such as are emitted by volcanoes at the present day. Yet in their chemical and structural characters they present resemblances to both groups. Some, such as quartzite, quartz schist, mica schist, marble and crystalline limestone, have much the same composition as sandstone, shale, and limestone; others, such as many gneisses, amphibolites, serpentines, and talcose schists, bear a similar relationship to igneous rocks, such as granite, diabase, and peridotite. The name metamorphic was ap-The name metamorphic was applied to this group by Lyell, who powerfully advocated the view that they were modified or altered by such agencies as heat, pressure, and crushing. This theory is now generally accepted, and it has been proposed to establish two subproposed to establish two sub-divisions, the ortho-gneises (originally igneous) and the paragneisses (originally sedimentary). Many regard these rocks as formed principally by the crushing which always takes place where mountain chains are being elevated by lateral compression of a belt of rocks (dynamo-metamorphism). Others insist that for the formation of wide areas of gneisses and schists peculiar conditions were necessary, which have not existed since the earlier stages of our planet's history. According to this school the typical metamorphic rocks must necessarily be older than all the fossiliferous systems. There is much evidence, however, to show that many schists are altered Palæozoic rocks, and that some may be Secondary or even Tertiary. They are very rarely fossiliferous, but in a few cases mica schists have been proved to contain recognizable organic remains. Another type of meta-morphism, about which there is less obscurity, is produced when creat masses of igneous rock are injected into the upper part of the earth's crust. The surrounding strata are hardened and in large measure re-crystallized, new minerals being formed, such as andalusite, garnet, pyroxene. This action is known as contact metamorphism, and one of the commonest products is a hard, flinty, fine-grained rock known as hornfels. Bosses of granite are usually surrounded by an 'aureole' of contact metamorphism, which is sometimes several miles across.

Metamorphosis, a term used in zoology to indicate the changes in structure and habits which occur in the life-histories of the frog, butterflies, and other ani-The change frequently, mals. though not invariably, involves a marked change in environment, as from water to land in the case of the frog, from the sedentary to the aerial life in the butterfly. The larval form before metamorphosis usually possesses certain characters which seem to be ancestral in type. It is an essential part of the conception of a metamorphosis that the young form (larva) should be capable of living an independent existence.

Métaphor, a figure of speech in which, instead of comparing (as in a simile) the qualities common to two objects, we bodily transfer the qualities of the one to the other. Thus the sentence, 'The man was as bold as a lion in the fight,' is a simile, man and lion being compared in respect of boldness. But the sentence, 'He was a lion in the fight,' is

a metaphor.

Meta-Phosphoric Acid. See

PHOSPHORIC ACID.

Metaphysic, a term which owes its origin to the fact that the treatise of Aristotle now called Metaphysics (meta, 'after') was placed by a later arranger of his works next in order after the treatises on Physics. Aristotle's own term for the subjectmatter of the Metaphysics was first philosophy or theology. In current usage, where a distinction is made between metaphysics and philosophy, the latter term has the wider meaning, and includes sciences like logic, psychology, and ethics, while the term metaphysics is reserved for the most fundamental philosophical inquiries into the nature of reality. See PHILOSOPHY; and Sidgwick's Philosophy: Its Scope and Relations (1902).

Metastasio, Pietro (1698-1782), Italian poet, was born at Rome (his name being originally Trapassi). He was advocate at Naples, till his literary fame secured him the post of imperial court poet at Vienna, where he lived from 1730 till his death. As a lyric poet he is at the head of those that wrote in the second

Areadian manner. But it is as a writer of melodramas (high-class librettos for music) that he became renowned throughout Europe. Nearly all his plays have been separately rendered into English (see, too, the selection by Hoole, 3 vols. 1800). The Opere were collected at Paris (1790-2), which edition was supplemented by the Opere Postume (1795), and in parts by the Florentine collections of 1820 and 1826. New letters were edited by Carducci (1883) and Traversi (1883). Fanny Burney wrote an elaborate memoir in 3 vols. (1796). See monographs by Falconi (1883), Tommasini (in the Scritti distoria e critica, 1891), Donadoni (1897), and Arcari (1902).

Metayer System, a system of farming land in which the cultivator pays his rent in kindgenerally a fixed proportion of the product, not a fixed amount. The system is common in France, where 14 per cent., and in Italy, where 50 per cent., of the land is cultivated on this plan; but it is declining in importance, Arthur Young estimating that in his time 87 per cent of the cultivated land of France was so farmed. The system has appeared spontaneously in America, where it is called farming on 'thirds' or 'halves,' as the proportion may be, and is akin to the stock-and-land leases of the English middle ages, both arising from the scarcity of labour. It exists also in the sugar islands of the W. Indies which have been French colonies. See Mill's Political Economy (1891).

Metazoa, the designation given to the multicellular animals in general, as contrasted with the l'rotozoa, the simplest animals, which consist of single cells, or of colonies of independent cells. It is characteristic of the Metazoa that not only does the body consist of many cells, but these cells are not each physiologically complete, but are arranged in at least two layers, which have different relations to the environment, and in consequence different functions. The distinction is of no practical, though of great theoretical improvement

theoretical, importance.

Metchnikov, Elias (1845),
Russian bacteriologist, was born
in the government of Kharkov,
and was appointed professor of
zoology at Odessa in 1870, and
in 1886 director of the bacteriological institute there. In 1890
he went to Paris to study under
Pasteur, and was appointed professor at the Pasteur Institute in
1904. His name is prominently
associated with the theory of
phagocytosis, or the destructive
power which the leucocytes, or
white blood corpuscles, possess
with regard to noxious bacteria

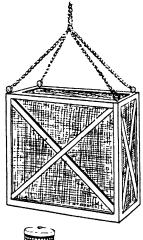
that invade the body, a theory of great importance in explaining immunity from disease. His views are expounded in Immunity in Infectious Diseases (Eng. trans. 1906). He has also written The Nature of Man (1903); and monographs on Nemertines and Echinoderms (1869), Siphonophora and Medusæ (1870 and 1886), Insects (1866), Scorptons (1870), Centipedes (1871), Worms, and Sponges. Metellus, a distinguished

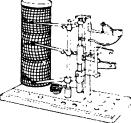
family of the plebeian Cacilian clan at ancient Rome:-Lucius CECILIUS METELLUS, consul in 251 B.C., when he defeated the Carthaginians in Sicily, and again in 249; as pontifex maximus he rescued the Palladium from a fire in the temple of Vesta, and in so doing lost his sight.—QUINTUS CECILIUS METELLUS, called Macedonicus, because when prætor in 148 B.C. he defeated Andriscus, a pretender to the throne of Macedonia. In 143 he was consul, and carried on war against the Celtiberians in Spain.—QUINTUS CECILIUS METELLUS, called Numidicus, because he carried on war successfully in Numidia against Jugurtha in 109 and 108 B.C. He was censor in 102, but in 100 Marius secured his banishment from Rome. He was a leader of the aristocratic party.- QUINTUS CECILIUS METELLUS, son of the above, called 'Pius' for the devotion he displayed towards his father in securing his recall from banishment. He was practor in 89 B.C., and fought in the social war. He took Sulla's side against the Marian party, and was consulwith Sulla in 80. From 79 to 72, as pro-consul in Spain, he carried on the war against Sertorius. He died in 63 B.C.—QUINTUS CECILIUS METELLUS PIUS SCIPIO was the adopted son of the above; his own father was Publius Scipio Nasica. He was consul in 52 B.C. along with Pompey, and fought on Pompey's side in the civil war. After the battle of Pharsalia he went over to Africa, when he was defeated by Casar at Thapsus in 46, and soon afterwards committed suicide.

Metempsychosis. See Trans-MIGRATION.

Meteorites. See AEROLITES.
Meteoritic Hypothesis, aspeculation in cosmogony, sketched by Sir Norman Lockyer in 1887, and fully described in Meteoritic Hypothesis (1890). Its fundamental idea is the development from swarms of meteorites of all the self-luminous bodies in space, beginning with nebulæ, and ascending through red to white stars; after that, the stages marked by solar and carbon stars. The meteoric constitution of nebulæ depends upon spectroscopic coincidences which have not been verified.

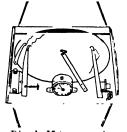
Meteorograph, an instrument giving a continuous record of fluctuations in pressure, temperature, and humidity on a moving





Richards's Meteorograph, with Cage.

sheet of paper driven by clockwork. The instrument is specially adapted for use with kites or balloons, the apparatus shown in the figure being that usually employed. This consists of three instruments—viz. a combined barograph, thermograph, and hygrograph—recording on one



Dines's Meteorograph.

cylinder, which revolves in about eight hours by means of a clock movement inside. The whole apparatus is made of aluminium, and weighs with the cage only 36 ounces. In use it is slung about 60 ft. beneath a kite, and brings down a record of the meteorological conditions at various heights in the atmosphere. See Richard's Instruments de

Précision (1897).

Meteorological Office, THE, was established in 1854 as a department of the Board of Trade, but is now under a director and committee appointed by his Ma-jesty's Treasury. It deals of-ficially with the meteorology of the British Isles, including the service of weather forecasts and storm warnings, the meteorology of the ocean, and some of the colonies and dependencies. The forecasts of weather issued from the office in London are based on telegraphic information from 27 stations in the British Isles, and 31 on the Continent or on Atlantic islands. The parliamentary vote for the Meteorological Office is £15,300. In 1905 a portion of this grant was assigned to promote the investigation of the upper air by kites and other means.

Meteorological Society, Royal. The earliest English Meteorological Society was founded in 1823. The Meteorological Society of London existed from 1836 to 1842. The Royal Meteorological Society was initiated on April 3, 1850, as the British Meteorological Society, but in 1882 it assumed its present title. A unique series of phenological observations from a network of stations well distributed over the British Isles has been carried on for a series of years, first under the direction of the Rev. T. A. Preston, and subsequently of Mr. Edward Mawley. The publications include Reports of the Council, Proceedings, and the Quarterly Journal. The statistical data obtained from the numerous stations are published in the Meteorological Record.

Meteorological Stations are places equipped with certified instruments, where regular observations of the various climatic elements are made twice a day. The instruments comprise a standard barometer, a hygrometer, a maximum and minimum thermometer, exposed in a properly made thermometer screen, a raingauge, a sunshine-recorder, and an anemometer. Of these stations there are in the British Isles about 160; but a considerable number of extra stations observe only once a day, while there are in addition over 3,500 places provided with rain-gauges. Taking the whole globe, there are 380 first-order stations, 2,620 of the second order, 6,600 of the third order, and 19,400 where rainfall observations are alone taken. In addition, temporary stations are at work during hay and corn harvest for special observations.

Meteorology is the science of the atmosphere, and embraces the investigation of all the properties, movements, and appearances occurring in the aerial envelope which surrounds our globe. The term as originally employed had reference, not only to atmospherical, but also to astronomical phenomena, and is more than two thousand years old, having been first used by Plato four hundred years B.C. Fifty years later, Aristotle discussed atmospheric phenomena as distinct from astronomy and astrology. phrastus, the pupil of Aristotle, wrote two books on the winds and on the signs of rain; and about the same period Aratus, in his poem Diosemeia, incorporated the meteorological lore then current. But meteorology as a science made little progress until the invention of instruments and the advent of the age of geo-graphical discovery. The oldest daily register of the weather extant dates from 1337, when William Merle began to observe in Oxford, and continued his records until 1344. The oldest meteorological instrument, the wind-vane, had its origin before the Christian era; but the absorption hygrometer, which is the next oldest, was not invented till the middle of the 15th century, while the condensation hygrometer did not make its appearance until a hundred years later. Next in chronological order came the thermometer, which was invented by Galileo towards the end of 1592; while the rain-gauge seems to have been used in the year 1639 by Castelli, a friend of Galileo. In the middle of the 17th century (1643) Torricelli discovered the weight of atmospheric air by barometric observations. In 1650 Otto von Guericke, by means of an air-pump invented by himself, performed the experiment of weighing a vessel full of air, and then the same vessel exhausted of air. His famous experiment with the Magdeburg hemispheres further demonstrated that the pressure of the atmosphere was equal in all directions. Boyle in England, and Marriotte in France, discovered the law bearing their respective names, that the pressure of gases is inversely as their volume; while Halley, a few years later, made a valuable contribution in his formulæ for measuring heights by the barometer, which Laplace subsequently brought to perfection. A great impetus to meteorological observations was the introduction by Fahrenheit in 1714 of mercurial thermometers having trustworthy scales. The first modern writer on the general circulation of the air was Edmund Halley, who, in 1699,

made a special voyage for the investigation of the ocean winds. The theory of the trade winds by John Hadley, published in the Philosophical Transactions for 1735, was a valuable contribu-tion to the science, and among important treatises appearing towards the end of the 18th century were Dalton's Meteorological Essays (1793), and works by Cotte and Richard. About this time, Kirwan, an English chemist, calculated the temperature for various parallels of latitude, and in 1817 Alexander von Humboldt published his Isothermal Lines, or lines of equal temperature over the surface of the globe, a work subsequently brought down to date by Dove in 1852, in The Distribu-tion of Heat on the Surface of the Globe. In 1889 Dr. Buchan published, as one of the Challenger expedition series, his Report on Atmospheric Circulation, giving the mean diurnal variation of atmospheric pressure at 147 stations, the mean monthly and annual pressure of the atmosphere at 1,366 stations, similar temperature values at 1,620 stations, and the mean monthly and annual direction of the wind at 746 stations. The most conspicuous feature of this voluminous and important work is the series of maps by which the interrelation and correlation of the various climatic elements are exhibited in a clear and graphic manner, thereby enabling the broad principles of meteorological physics to be succinctly generalize l.

In 1654 meteorological instruments were distributed in Italy by Ferdinand II., grand-duke of Tuscany, and observations several times a day begun at a dozen Meteorological sociestations. ties were founded about the middle of the 19th century. The first proposal for the use of the telegraph for weather forecasting was by Carl Kreil in 1842 -a method which Admiral Fitzroy did much to popularize about 1860; and now each country has a weather bureau or central office, with which a large number of stations are connected, which re-port several times a day by means of the telegraph. In this way a knowledge of the meteorological conditions prevailing over a wide extent of the earth's surface at a given moment is available, and the course of storms approximately indicated. Much valuable information regarding the science of the air has been gathered in recent years from mountain observatories, balloons, and kites, as well as from the spread of meteorological stations over the globe, and from observations taken at sea.

An important service rendered by meteorology has been in the domain of medical climatology, which is the study of the influence of the various physical elements of climate upon the human organism. The meteorological conditions favourable to the successful cultivation of tobacco, tea, coffee, and cotton can be studied from the maps that show the distribution over the globe of the various climatic elements.

The principal meteorological phenomena naturally fall into two groups -viz, those produced by the daily rotation of the earth on its own axis; and the great seasonal changes which primarily depend on the revolution of the earth round the sun. To these groups may be added a third - viz. 'eyclical variations,' which are related to the number and frequency of spots on the solar disc. The greatest factor in de-termining the climate of a place is its latitude, because this determines the angle at which the sun's rays strike the surface of the earth, as well as the length of time it is above the horizon each day. Taking the case of a cylindrical beam, its heating power on any horizontal portion of the earth's surface will be concentrated on an area which varies with the sine of the sun's altitude at the moment. The variability increases with distance from the equator, where the heating power of the sun at noon oscillates to the extent of only 7.5 per cent. of its maximum amount, while in lat. 45' the variation is as much as 60 5 per cent. Further, a large proportion of heat is absorbed in passing through the dense lower strata of the atmosphere, the loss by absorption being more than 20 per cent. at the equator, while at the poles nearly all the solar heat is thus intercepted, the solar beams in these regions being nearly horizontal. The latitude of a place further determines the intensity of terrestrial radiation, or the escape of heat from the earth's surface through the upper regions of the atmosphere and into space. This, although it reaches its maximum during the night, goes on all day independently of the sun's heating, the greatest effect being observable in high latitudes during the long polar night. In nearly all parts of the globe, however, the effect of the sun's heat is modified or increased by powerful secondary agencies, as the provailing winds and oceanic circulation. effect of the warm waters of the Gulf Stream on the climate of N.W. Europe may be cited as an example of the influence exerted on climate by the waters of the ocean. But for these waters the January temperature of the re-

gions affected by them would be lowered as much as 37° r. in lat. 60° N., increasing to 41° in lat. 70° N. In summer, on the other hand, the warming influence is very slight, amounting to only half a degree, while in lower latitudes the Gulf Stream actually depresses the summer temperature. On the other hand, the Arctic current which skirts the coast of Labrador is responsible for the rigorous climate of that region, the coldness of which is out of all proportion to what would be the case were latitude the only factor involved. If we look at the meteorological records of various places over the globe, we find that in the tropics the forces at work are shown in a simple and uninvolved manner; in Europe, on the other hand, the conditions affecting climate are of the most intricate and involved character. In the tropics, speaking generally, there are two varieties of weather, known as the 'dry season' and the 'rainy season;' but in Europe there is no such regularity in the dis-tribution of rainfull. The same applies to the other elements of climate, more especially during the winter months. As an example of the variations of temperature that may be expected in the tropics and in Europe, we may compare Madras in the region of monsoons with Tornea at the head of the Gulf of Bothnia. In January during forty-seven years at Madras the mean temperature of the coldest month was 4° F. below the general average for the whole period, while the warmest was 37° above it— an extreme range of 7.7° in the mean temperature of all the mean temperature of all the Januaries. In Tornei, on the other hand, during thirty-two years the coldest January was 16.4° F. below the normal, and the warmest 11.9° in excess of the average—a range of 28.3°. Even in the Paitinh learn average was a large of the coldent of the painting the p in the British Isles considerable variations occur in spite of the conserving influence exerted by the aqueous vapour of the air upon its temperature. 1795 in Edinburgh, for instance, had a mean temperature of 29.9° F.; while in the January of 1896 the average temperature was 43.8°—a difference of 13.9° between the two Januaries. In the Indian peninsula weather changes are brought about by the monsoons, which blow with great regularity, and reflect the simplicity of the seasonal distribution of pressure and wind circulation over Asia and the oceans contiguous. In ordinary winters Europe is under the influence of deep cyclonic systems, which sweep in a north-easterly clevation along the west coast of Ireland to the north of Norway.

bringing a flow of warm moist winds from lower latitudes over the British Isles. In some winters, however, as in that of 1895, the distribution of pressure is quite changed -- the barometer being highest over Norway, Sweden, and Russia, decreasing as we proceed south-westwards over the Bay of Biscay and out into the Atlantic. Under these conditions the cold air from Eurasia is drawn over the British Isles, the prevailing winds, owing to distribution of pressure, being from the north and east. these anomalics in the distribution of barometric pressure that are responsible for the very marked differences in the winters of N.W. Europe.

Diurnal Phenomena. - On looking at a continuous curve of temperature obtained by mechanical or by photographic methods, we find that there is usually a more or less regular rise of temperature during the early forenoon, which culminates in a maximum about 2 P.M., after which a fall occurs, which continues until the early morning. The course of this curve varies from day to day with the weather and the locality. On cloudy days there is little variation, the diurnal range of temperature being slight or obliterated altogether; but on hot sunny days, especially in early summer when the air is dry, the variation is very large. Distance from the sea-coast is an important factor in determining the amplitude of the daily curve, the diurnal range being small at ccast stations owing to the large quantity of aqueous vapour usually present; but at inland places, especially on elevated continental plateaus where there is little moisture in the air, the range between day and night is excessive. The daily variation of the barometer is most marked in tropical regions, and diminishes in higher latitudes, disappearing as we come within the Arctic and Antarctic circles. The daily curve shows two maxima, at 10 A.M. and 10 P.M., and two minima, at 3 A.M. and 3 P.M. Of these the most marked are the 10 A.M. maximun and the 3 P.M. minimum. The 3 P.M. minimum is believed to be due to the ascent of warm and consequently lighter air, caused by solar heating, and this air tends to flow away from the day hemisphere to that which is in darkness. The 10 P.M. maximum is largely due to condensation of the air after nocturnal cooling. The diurnal range of pressure is modified by proximity to the sea, or even to large lakes, and depends in no small degree on the amount of water vapour in the air. At Calcutta the extreme daily oscillation is as much as

0'116 in., while in the tropics generally it amounts to one-tenth of an inch. At Plymouth it is about 0'020 in., and at St. Petersburg only 0'012 in. The velocity of the wind presents a very decided diurnal period not unlike that of the temperature curve, the force being least about sunrise and greatest in the afternoon. After sunset the atmosphere contracts, reverting to a condition of greater stability, and the force of the wind diminishes. The daily period of summerthunderstormsiswell marked, as they are most frequent in the early afternoon, when the temperature is at a maximum. winter storms occur at all hours. The distribution of the fall of rain throughout the day shows a maximum at two or three o'clock in the afternoon, but on the Atlantic coast of Ireland the maximum occurs in the early morning.

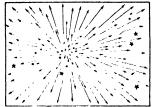
Weather cycles, of which the most generally recognized is Bruckner's thirty-five years' period, show a connection with sun-spot phenomena. These spots wax and wane at intervals slightly exceeding eleven years, and Bruckner has traced a connection too between these phenomena and the occurrence of cyclones, rainfall, including droughts, temperature, floods, famines, and vintages, which show a periodicity separated by the sun-spot cycles, or about thirty-five years. The relations between solar and terrestrial phenomena, however, are of a more complex and intricate nature than is generally supposed.

The physical cause of rain is to be found in the chilling of comparatively warm air more or less charged with moisture. This may take place in several ways, as by the contact of warm moist air with the cold surface of the land, or by the ascension of a stream of humid air, which is chilled by expansion as it rises into the colder region of the atmosphere. It was supposed, until a comparatively recent period, that the commixture of masses of hot and cold air was a potent factor in the causation of rain. It has, however, been demonstrated by Dr. Hann that latent heat is set free when condensation is taking place, and this largely prevents the reduction of temperature and the resulting rainfall. The distribution of rain over any country depends to a great extent on the physical configuration of the land, especially the position of the mountain chains with reference to the prevailing winds. Thus in Britain, for example, the predominant winds are west or south-west. These winds reach the mountainous western

coasts laden with moisture, which is speedily precipitated in the form of rain or snow, as the air is cooled below saturation point by contact with the cold hillsides. As these winds travel eastwards they gradually lose their moisture through condensation, and at the same time their temperature is raised and their capacity for moisture increased by a dynamical process due to their descent and consequent compression. For this reason the west wind is a dry one along the eastern seaboard. The wet winds on the cast coast are those which blow off the cold surface of the sea, and these, again, are rapidly deprived of their moisture as they pass from east to west. The wettest regions of the globe are in the zone of equatorial calms over the Atlantic and the Pacific, and in certain situations where warm damp ecean winds are forced upwards by contact with mountain ranges. Such places are Cherra Punji in the Khasi Hills in Assam, with an annual rainfall of over 400 in.; the W. Ghats, with Mahabaleshwar, where the rainfall is 260 in.; many parts of the west coast of Britain, as Ben Nevis, Scathwaite and the Styhead in Cumberland, and the Gap of Dunloe in Ireland. The driest regions are frequently found in places on the lee side of the mountains which have drained the prevailing wind of all its moisture. Such exist in the Kalahari Desert, the southern steppes of Russia, the interior of Australia, the Great Salt Lake region in America, and in Peru and Chile between the Andes and the Pacific. Speaking generally, the amount of rain increases with the height above the sea, but only up to comparatively moderate elevations. See the text-books elevations. on meteorology by Buchan (1868), Scott (1885), Moore (1894), Loomis (1868), Waldo (1893), and Russell; also Dr. Buchan's Report on Atmospheric Circulation (1889), Bartholomew's Atlas of Meteorology, and Dr. Hann's Lehrbuch der Meteorologie (1901). Consult the Journals of the Scottish Meteorological Society and the Royal Meteorological Society, in Symon's Meteorological Magazine, and in the publications of the London Meteorological Office and the United States Weather Bureau.

Meteors, small cosmical bodies encountered by the earth, and rendered luminous by the resistance of its atmosphere. Some travel round the sun in hyperbolic paths, others in long ellipses. Nearly all those kindled in the air eventually become incorporated with the earth, either as impalpable dust, or in the massive form of aerolites.

The data required for determining the orbits of meteors are the time of their first becoming visible, together with the direction and rate of their motion. Besides those that appear sporadically, there are multitudes associated into systems, the antiquity of which can be roughly gauged by the degree of their scattering. For it results from the inequalities of solar and planetary attraction upon the individual members of the group, and proceeds until the original swarm is dispersed into a ring co-extensive with the orbital ellipse. Judging by this criterion, the Perseid meteors were introduced into the solar family earlier than the Leonids. Only those meteors come within our ken which follow paths intersecting that of the earth. Members of the same system can be identified by their emanation from a single 'radiant,' or the vanishing-point in the sky of their parallel tracks. Owing, however, to slight irregularities in their travelling, the radiant is diffused into a small area. Moreover, some meteoric streams are so wide that the earth takes



Met ors: Radiant of the Leonids.

several days to cut through them: and in this case the radiant is subject to a kind of aberration, causing it to shift forward with the displacement of the terrestrial viewpoint. Yet this seemingly inevitable effect does not always ensue. Stationary radiants, as Mr. Denning discovered in 1878, undoubtedly exist, nor have they been satisfactorily explained. Mr. Denning has catalogued three thousand radiants, each supposed to represent a distinct meteoric orbit; but of these only about one hundred are unmistakably characterized. these systems probably originated in the decay of comets; and in four cases a genetic connection has been securely established. The Leonid meteors, the Perseids, the Lyrids, and the Andromedes have each a known cometary associate. A brilliant Lyrid shower was witnessed April 20, 1803, and periodical displays from the same radiant (in R.A. 271°, D. + 33°) have been traced back to the year 582 A.D. related comet passed perihelion

in 1861, and completes its circuits in 415 years. The Andronnedes diverge from a space near γ Andronnedes, and represent the débits of Biela's vanished court. They revolve in 63 years, and meet the earth in the latter half of November, about three days carlier at each recurrence. For, their motion being direct, the node retrogrades; and for this reason, too, they overtake the earth, and traverse the sky sluggishly, leaving trains of yellowish sparks. The photographic registration of meteor-paths has been initiated at some American observatories.

Metford, William Ellis (1824-99), English inventor, was born at Taunton, Somerset. He was a civil engineer, and obtained an appointment on the East Indian Ry. (1857), but returned after the mutiny. He was much interested in mechanical improvements on the rifle, and discovered the shallow-groove principle. This, combined with the Lee (American) action, produced the Lee-Metford rifle.

Methane, marsh gas, CH4, is the first member and parent substance of the series of paraffin hydrocarbons. It is produced in nature by the decay of vegetable matter out of contact of the air, and thus rises in bubbles from marshy water, is set free as 'fire damp' when coal is cut, and probably owes its presence in the natural gas that escapes from the earth in the United States, Caucasus, and other places to a similar cause. Methane is Methane is usually prepared artificially by heating sodium acetate with soda CH3COONa + NaOH = The CH_3COON_3 Thach $CH_4 + Na_2CO_3$ though the substitution of barium oxide for the soda lime gives a purer prod-It is a colourless, cdourless gas that liquefies at - 1647 C., and has a critical temperature of - 62° c. It is lighter than air, and almost insoluble in water. Chemically, methane is very inert, resisting the action of most reagents. Chlorine, however, successively replaces its hydrogen atoms if exposed to light; and it also burns, if ignited in air, with a somewhat luminous flame, forming carbon dioxide and water. When previously mixed with air or oxygen, it explodes violently when set on fire-the disastrous effects of colliery explosions being largely due to such a mixture catching fire. Methane forms from 30 to 40 per cent. of ordinary coal gas, being one of the chief sources of the heat and light giving power.

Metheglin. See Hydromel. Methil, seapt. vil. in Wemyss par., Fifeshire, Scotland, 1 m. s.w. of Leven. It exports coal. Pop. (1901) 6,122.

Methodism owes its origin to the brothers John and Charles Wesley. Whilst at Oxford they formed a club for the purpose of acquiring regular habits of religious study and work; in Wesley's own words, they resolved to live by rule and method.' This earned for them the designation of Methodists. Eventually the club became wholly religious, the members caring for the sick and poor of the town and visiting the prison. The first actual Methodist society was formed in 1739. Other societies rapidly sprung up in various parts of England, Wesley dividing them into smaller companies called 'classes,' which met once a week, the leader inquiring into the spiritual state of his members, and receiving from them 'weekly contributions towards the support of the gospel.' The class meeting forms an essential function of Methodism to-day.

Organization. The chief assembly and supreme court of Methodism is the Annual Conference. Down to 1784 it consisted of such of Wesley's preachers as he wished to call together, but in that year a legal constitution was given. Until 1877 the conference consisted of ministers only, but in 1878 a scheme of lay representation was introduced and adopted. The conference at the present time combines two functions: it is in part an assembly of co-pastors, annually meeting to exercise mutual discipline, and to take mutual counsel in regard to such questions as are specifically pastoral subjects, and in part it is a conjoint assembly of ministers and lay brethren convened to receive reports and to deliberate and determine in regard to the general interests of the connexion.' legal body, called the Legal Conference, consists of a hundred members, elected either by seni-ority or by vote of the whole conference. This body endorses and adopts what has been done in the general conference. Next in importance is the District Synod, which meets twice a year i.c. May and September, the September meeting being chiefly given to the consideration of During the pastoral finance. session ministers only are in attendance; circuit stewards and elected laymen are admitted to the other session. The pastoral session makes inquiry into the character of ministers, and re-commends ministerial candidates to the conference. The lay session considers the spiritual condition of the circuits, receives reports of various connexional funds, and sends recommendations to the conference.

The Circuit Quarterly Meeting consists of representatives from each chapel in a circuit. This meeting reviews the general affairs of the circuit, financial and spiritual. The Leaders' Meeting consists of stewards and leaders at a chapel, and forms 'a kind of local church council.

Wesleyan Methodist ministers change their circuit every three years, save under exceptional circumstances. In early Methodism, Wesley's 'helpers' (as he then called them) usually did not stay in any one place longer than twelve months, but in 1784 the legal constitution declared that the conference had the power of appointing a minister

a very slender part of religion, if it can be allowed to be any part of it at all; that neither does religion consist in negatives, in bare harmlessness of any kind, nor merely in externals, in doing good, or using the means of grace, in works of piety (so called) or of charity; that it is nothing short of or different from "the mind that was in Christ," the image of God stamped upon the heart, inward rightcousness, attended with the peace of God, and "joy in the Holy Ghost." Secondly, that the only way under heaven to this religion is to "repent and believe the gospel"—or (as the apostle words it), "repentance towards God, and faith in our Lord Jesus

Mention should be made of the various agencies of Wesleyan Methodism - e.g. the Foreign and Home Missionary Society, the Book Room, and the Children's Home, with various connexional funds established by Wesley. There are in England four theological colleges for the training of ministers--viz. Richmond (chiefly for missionaries), Headingly, Handsworth, and Didsbury.

The present state of Wesleyan Methodism may thus be summarized. There are in Great marized. There are in Great Britain 2,303 Wesleyan ministers; 531,150 church members; 7,498 Sunday schools, with 1,139,816 scholars and teachers; the chapels and places of worship number



The Wesleyan Methodist Hall, Westminster. (Selected design by Messrs. Lanchester & Richards. From 'The Builder,' June 24, 1935.)

for three years, but not more, to the same chapel or chapels in a circuit. Several unsuccessful attempts have been made to alter this rule, and there is a growing conviction that the term should be extended. Lay or local preachers fill an important place in Methodism, the pulpits in many villages being almost wholly oc-cupied by them. There is a local preachers' quarterly meeting, presided over by the superintendent of the circuit.

of the circuit.

Doctrine.—In A Plain Account
of the People called Methodists
(1748) Wesley thus defines the
doctrines of the sect:—'The
points we chiefly insisted upon
were four: First, that orthodoxy, or right opinions, is at least but

Christ." Thirdly, that by this faith "he that worketh not, but believeth on Him that justifieth the ungodly, is justified freely by His grace, through the redemption which is in Jesus Christ." And, lastly, that, "being justified by faith," we taste of the heaven to which we are going; we are holy and happy; we tread down sin and fear, and "sit in heavenly places with Christ Jesus."

The form of service is characterized by simplicity, the sing-ing of hymns, the reading of two Scripture lessons, extempore prayers, and the sermon; although in many chapels this is considerably elaborated, and at morning worship the Anglican liturgical service is used.

8,633. There are 583 ministers in foreign mission stations, with 126,752 members. The 'forward movement' of 1885 has resulted in the establishment of active mission centres in London, Manchester, and other large towns, and in the erection of numerous mission and preaching halls. At the beginning of the 20th century a great effort was made to raise a 'thanksgiving fund' of one million guineas for aggressive work throughout Wesleyan Methodism.

There have been numerous se-

cessions from the original body, chiefly the result of differences as regards church organization. The following is a brief account of these. (1.) Methodist New Connexion, formed 1797. It arose out of a dispute regarding the position and rights of the laity, and was led by Kilham; he and his party desired more power for the members, and less for the ministers. At the Conference of 1794. Kilham was expelled the connexion; 5,000 followed him, and thus the new body was formed. Their members now number 44,464. (2.) Protestant Methodists. A like spirit prompted this agitation, the climax being reached when an organ was placed in Brunswick chapel, Leeds, by the trustees, with the consent of conference, but against the general wish of the members. Wesleyan Methodist Association. This arose out of a decision by the Conference of 1784 to provide a theological college for the training of ministers. Dr. Warren led this agitation. The Protestant Methodists eventually joined with this secession, and both were absorbed with the 'Wesleyan Methodist Reforms,' and formed (4.) the United Meth-This body odist Free Church. now numbers 448 ministers and 101,820 members. A number of reformers refused to amalgamate, and they became known as the westeyan Reform Union. (5.)

Westeyan Reform Union. (5.) (5.) with the Bible Christians, are more an irregular 'growth' than a secession. Founded by two lay preachers, Bourne and Clowes, who did not find full scope for their ideas in the old body, and because of their violation of the Conference regulations, chiefly as to camp-meetings. The first Conference was held in 1820. This is now the largest of all bodies sprung from the Methodist, having 205,849 church members and 1,124 ministers, with 5,072 chapels. A characteristic of their organization is the limited power of the ministers. Vigorous missionary work is carried on, and over £30,000 per annum is raised for such purposes. (6.) The Bible Christians ('Bryanites') originated in Cornwall in 1815. Founded by a Cornish local preacher named O'Bryan, whose method of work proved too irregular for the Wesleyan Confer-Their ministers now numence. her 210, their members 33,373, with 648 chapels.

Methodism in America.—The Methodist Church is the leading church of that country. It was first introduced about 1766 by Irish emigrants. Richard Boardman and Joseph Pilmoor left England in 1769, as a result of an appeal raade by Wesley for volunteers for the American work; a few years later Wesley sent out Dr. Coke, first ordaining him 'as superintendent, as bishop in fact... in order that he in turn might

ordain Francis Asbury elder and bishop; thus, in American Methodism we have Methodist bishops. The first General Conference was held in 1784; after 1792 conferences were regularly held every four years. There are conspicuous differences from the mother church. 'In the spirit and character of its government and ad-'In the spirit and charministration it is far less popular, far more clerical. . . . it has more alliance with the administrative genius of the Church of England than English Methodism.' The North and South Methodist Episcopal Churches now number 24,455 ministers, with 4,548,414 church members. This body is the largest; but there are numerous other less influential bodies. In Canada the Methodist Church is less extensive, its members numbering 305,814, with 2,082 ministers. The following are the statistics of Methodism throughout_the world:-Church members, 7,959,549; ministers, 49,524; lay preachers, 108,172; Sunday-school scholars, 6,597, 145;

sunday-senon

Methodius. See Cyril and Methodius.

Methuen, PAUL SANFORD, THIRD BARON (1845), British general, was born at Nynehead, Somersetshire. He served on the Gold Coast (1873), Ashanti (1874), and in the Egyptian war (1882), being present at Kassassin (Sept. 9) and Tell-el-Kebir. In the Bechuanaland expedition, under Sir Charles Warren (1884-5), he was in command of Methuen's Horse. On the outbreak of the Boer war (1899) he proceeded to S. Africa in command of the First Infantry Division. He defeated the Boers at Belmont (Nov. 23), at Enslin (Nov. 25), and forced the Boers to retire at the Modder R. (Nov. 28), but was repulsed at Magersfontein (Dec. 11). He was wounded and taken prisoner at Tweebosch (March 7, 1902) by Delarey. The Boer general generously released his prisoner. In 1904 Methuen was appointed to the Eastern command.

Methuen Treaty, the standard illustration of the mercantile system, was signed in 1703 by Portugal and England, Methuen being the English envoy at Lisbon. Its provisions were the removal of the prohibition by Portugal of the importation of English woollens, and a preference

given by England to Portuguese wines over French. The treaty was not finally abrogated till 1236

Methuselah, the son of Enoch, and the grandfather of Noah, was of the family of Seth. According to Gen. 5:27, he lived to the age of 969 years.

age of 969 years.

Methyl, the alkyl group, CH₃,
that occurs in many carben compounds: for example, CH₃l and
CH₃OH are methyl iodide and
methyl alcohol respectively.

Methyl Alcohol, or wood spirit (CH₃OH), is the simplest of the series of alkyl hydroxides or alcohols. It is one of the chief components of the liquid obtained by distilling wood, and is prepared from this product by distillation from lime, followed by the formation and subsequent decomposition of its compound with calcium chloride, or of its oxalic ester. Methyl alcohol is a colourless liquid (sp. gr. at 0° c., 79) that boils at 66 c., has a faint spirituous odour, mixes with water, and dissolves fats. It has intoxicating properties, and when oxidized yields formaldehyde and formic acid in turn. Besides its use in the prepara-tion of dyes, it is employed in the crude state as a solvent for varnishes and to mix with ethyl alcohol to convert it into methylated spirit, and thus 'denature' it or render it undenature' suitable for drinking purposes.

Methyl Aldehyde. See For-MALDEHYDE.

Methylated Spirit consists of rectified spirits (i.e. 90 per cent. alcohol) 'denatured,' or rendered unfit for drinking purposes, by the addition of 10 per cent. of crude wood spirit and threeeighths per cent, of mineral naphtha. This spirit may, under restrictions, be sold duty free for burning, varnish-making, and so forth, further restrictions being imposed by the excise if the mineral naphtha, which renders the spirit turbid on dilution, is omitted. Whilst this method of denaturing is not entirely efficacious in preventing the drinking of the spirit, the impurities introduced make it very unsuitable for use in the laboratory and in the chemical trade.

Methylene Blue is a sulstituted thionine, having the composition



It is formed by a complex series of reactions, and used as dye for silk and cotton.

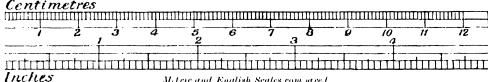
Metis, in ancient Greek mythology the goddess of prudence; she was the daughter of Oceanus and Tethys, and the first wife of Zeus.

Metkovic, mrkt. tn., Dalmatia, Austria, on Narenta, 22 m. s.s.w. of Mostar (practically its port). Pop. (1900) 4,878.

Meton, a native of ancient Athens, who lived during the latter part of the 5th century B.C. An astronomer, he devised the so-called Metonic cycle of nineteen years. See CALENDAR.

Office, London. The following are the principal denominations in use:

Measures of Length.-10 millimetres (mm.) - 1 centimetre = 0.3937 inch; 100 centimetres (cm.) = 1 metre = 39.37 inch; 1,000 metres (m.) = 1 kilometre= 0.621 mile. For the measurement of minute lengths the mino better than the yard as a standard, the system based on it is much more convenient than the British in that, the multiples and submultiples being on the decimal system, much time and trouble are saved in reduction, and quantities are expressed as the decimal of one denomination and not in several. Again, the



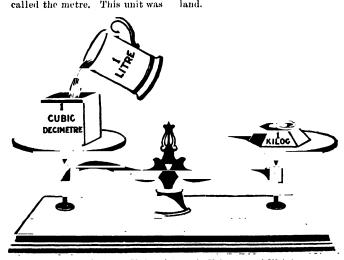
Metric and English Scales compared.

Metope, a thin slab placed between the supporting triglyphs of the frieze in trabeated architecture. Its surface is sometimes decorated with sculpture, as in the Parthenon, and sometimes plain.

Metre. See Metric System. Metre (in poetry). See VERSE. Metric System, a system of weights and measures instituted by the French republic in 1801 and based on a unit of length cron (μ) , = 0.001 mm., and the micromillimetre $(\mu\mu)_1 = 0.000001$ mm., are employed.

Masures of Arca.—100 square millimetres (sq. mm.) = 1 sq. centimetre = 0'155 sq. in.; 10,000 sq. centimetres (sq. cm.) = 1 sq. metre = 1'196 sq. yds.; 1,000,000 sq. metres (sq. m.) 1 sq. kilosq. metres (sq. m.) 1 sq. kilometre (sq. km.) = 0.386 sq. mile. The are, =100 sq. m., and the hectare, =10,000 sq. m., = 2.47 acres, are used for measuring land.

measures of area and volume are simply related to those of length, and the gram is so chosen as to be the weight of I cubic centimetre of water (measured at the point of its maximum density at 4 'c.). The metric system is the legal standard in use by three hundred million people in twenty countries, and it is much to be regretted that it is not compulsory in Great Britain, instead of being merely a practically inoperative alternative.



Relation of Metric Units of Length, Volume, and Weight.

originally intended to be equal to the one ten-millionth part of the distance from the pole to the equator; but subsequent measurements of the meridian proved that the metre had been made slightly too small, so it is now defined as the length of a certain bar of iridio-platinum. The French standard is preserved in the Bureau des Archives in Paris, and a copy, as a British standard, is also deposited in the Standards

Measures of Volume, -1,000 cubic centinetres (c.c.) = 1 litre = 1.76 pint; 1,000 litres (l.) = 1 cubic metre = 35.315 cubic ft.

Measures of Mass (weight).— 1,000 milligrams (mgm.) = 1 gram = 15'4 grains; 1,000 grams (gm.) = 1 kilogram = 2'205 lbs.; 1,000 kilograms (kgm.)=1 metric ton = 98 ton. The quintal, = 100 kilograms, is used for weighing

Though in itself the metre is



Metronome.

Metronome, an instrument used for indicating and securing exact degrees of tempo in musi-cal performances. The bestcal performances. known form-Maelzel's, patented 1816 - consists of a pyramidal case enclosing a clockwork mechanism which drives a double pendulum, having a sliding weight attached to its upper and longer rod. Behind this rod is an upright scale of numbered lines, corresponding with lines on the rod itself. Placing the weight with its upper edge in line with the number required causes the pendulum to oscillate an equivalent number of times per minute: thus M.M. = 60 signifies a speed of sixty crotchets per minute.

Metropolitan. See ARCH-BISHOP.

Metropolitan Asylums Board. See Asylums Boards. Metropolitan Police. POLICE.

Metropolitan Police Courts. About the middle of the 18th century a public office to which paid magistrates were attached was established at Bow Street. In 1792 the king was authorized In 1792 the king was authorized to create seven public offices in the parishes of (1) St. Margaret's, Westminster; (2) St. James's, Westminster; (3) St. James's, Clerkenwell; (4) St. Leonard's, Shoreditch; (5) St. Mary's, Whitechapel; (6) St. Paul's, Shadwell; and (7) at or near St. Mary's, Westerster, Hilling the horsuch Margaret's Hill, in the borough of Southwark. Three justices of Southwark. were appointed for each office, one of whom had to sit daily from 10 to 8, along with any of the county justices who chese to attend. The appointed justices received a salary of £400 a year out of the fees, and had power to employ six police constables at each office. Thus an end was put to the abuse of 'trading justices,' or justices who exercised their office for the sake of fees. The act was continued and amended by a series of acts which shortened the hours of attendance. increased the salaries of the justices, added to their powers, and authorized the employment of additional police. In 1800 the Thames police office was established at Wapping New Stairs. It was intended principally to deal with crime on the river. The justices appointed were authorized to employ a sufficient number of constables, and thirty Thames police surveyors over the constables. This was the origin of the Thames police. In 1821 the office at Shadwell was abolished, and a new office established in the parish of Marylebone. The Metropolitan police (see POLICE) was established in 1829, and it then became possible to confine the police magistrates to purely judicial duties, and to take from them all control of the police. Whitechapel police court was removed to Lambeth in 1844, and four new police courts have been established -viz. the North London, the West London, the Southwest London, and the Greenwich and Woolwich. There are now twenty-five metropolitan police magistrates. They must be barristers who have been in active practice for seven years next before their appointment, or stipendiary magistrates of some place in England or Wales. One metropolitan police magistrate, when sitting in a metropolitan police court, has the powers of two justices.

Metropolitan Water Board.
The water supply of London is
drawn mostly from the Thames.
The other sources of supply are
the river Lea and springs and
wells in the metropolitan water
area. It is distributed to a popu-

lation of over 61 millions. Up till June 24, 1904, the whole of the supply was undertaken by eight companies—the New River, East London, Grand Junction, West Middlesex, Lambeth, Southwark and Vauxhall, Chelsca and Kent Companies. The Metropolitan Water Board was created for the purpose of carrying out the provisions of the London Water (Purchase) Act 1902. It consists of sixty-six members, representing the county councils of London, Essex, Herts, Kent, and Middlesex, the City of London, the City of Westminster, the Thames Conservancy, the Lea Conservancy Board, the Metropolitan Boroughs, and other authorities within the water area. The pre-existing companies were transferred to the Board on the above date.

Metrosideros, a genus of tropical evergreen trees belonging to the order Myrtaccee. Some hear shows campanulate flowers

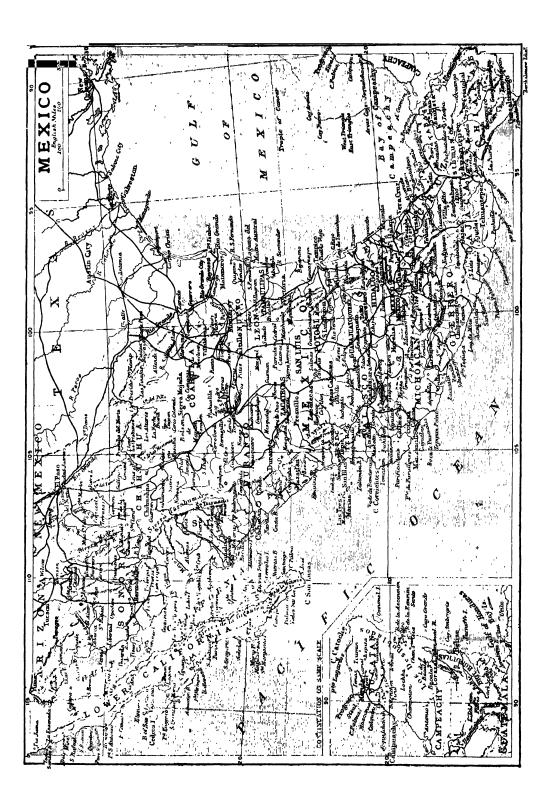
bear showy campanulate flowers.

Metsu, or Metzu, Gabriel.

(1630-67), Dutch painter, born at Leyden; was a pupil of Gerard Dou, and became a member of the Leyden Painters' Guild (1648), but spent the rest of his life in Amsterdam. He painted genre pictures and scenes from domestic life. He was a better draughtsman than Dou. Three of his pictures are in the National Gallery, London; four in the Wallace Collection, London; and some in Buckingham Palace.

Metternich, CLEMENS WEN-ZEL LOTHAR, COUNT, afterwards PRINCE (1773–1859), chief minister of Austria from 1809 to 1848, was born at Koblenz, and was trained for a diplomatic career. In 1795 he married the grand-daughter and heiress of the Austrian minister Kaunitz, and from this time hold a prominent pesi-tion at the court of Vienna. After attending the Congress of Rastatt in 1798, he was appointed ambassador to Berlin in 1803. There he showed such ability and tact that in 1806 he was chosen to represent Austria at the court of Napoleon. While he was there, the pro-German policy of Count Stadion involved Austria in another war with imperial France, which led to the battle of Wagram and the humiliating treaty of Vienna in 1809. Count Stadion was dismissed, and Metternich was appointed to take his place. The new minister set himself the task of restoring Austrian prestige by that policy of enlightened selfishness which he pursued for the next thirty years. His first achievement was to conclude a marriage alliance with Napoleon. Josephine was di-vorced, and in 1810 Metternich himself escorted the Archduchess Marie Louise to Paris. In 1813

French victories at Lützen and Bautzen compelled Russia and Prussia to become supplicants for Austrian assistance, and enabled Metternich to dictate his own terms to his allies. By the treaty of Töplitz, Austria organize t the great coalition which won the all-important victory at Leipzig, and by invading France extorted Napoleon's abdication. Metternich was a signatory of the treaty of Paris, and he was chosen to preside over the congress which met at Vienna to arrange the reorganization of Europe. He set himself to check the aggrandizement of Russia and Prussia, and, above all, to oppose any recognition of national unity in Germany or Italy. He was eminently suc-cessful. Germany was organized in an extremely loose confederation, with Austria as perpetual president; and Austria was enabled, by the occupation of Lombardy and Venetia, to dominate the lesser states of the Italian peninsula. From 1815 Metternich became the avowed champion of conservatism in Europe. In the so-called Holy Alliance his skil-ful diplomacy enabled him to take the leading position, and he employed the concert of the great powers to repress all tendencies to liberty and national independence. Risings in Naples, Piedmont, and Spain were put down by force. At the congresses of Aix-la-Chapelle, Troppau, and Laibach the chief rulors of Europe followed Metternich's dexterous guidance in maintaining an efficient police for the suppression of revolution. gradually the Holy Alliance, and with it the predeminance of Metternich, was weakened by inevitable discord. Great Britain asserted the principle of non-intervention. Russia was impelled by self-interest to support the Greek rebellion against Turkey. France, in 1830, expelled the reactionary Charles x. in faveur of the citizen king Louis Philippe. Belgium succeeded in freeing itself from the connection with Holland. The revolutionary movement of 1848 finally overthrew the administration of Metternich. He sought refuge in England, and never resumed office. Metternich was a diplomatist rather than a statesman. He spent his life in opposing forces which were destined to triumph in the end, and no lasting achievement can be attributed to him. See Colonel Malleson's Metternich (1888); Schmidt-Weissenfels's Fürst Metternich, Geschichte scines Lebens (1860); Demelitsch's Metternich und seine auswärtige Politik (1898, etc.); and Strobl von Ravensberg's Metternich und scine Zcit (1906, etc.).



Metternichia, a genus of tropical evergreen trees belonging to the order Solanaceae. There are only two species, both natives of S. America; in Britain they are only capable of stove cultivation. M. principis bears terminal racemes of white, infundibuliform

flowers in late summer.

Metz, fort. tn., Lorraine, Germany, on Moselle, 33 m. by rail N. of Nancy. 1ts cathedral, com-menced in the 13th century and completed in 1546, contains a famous bell. The streets and open spaces show many quaint old buildings. In the northern cometery there is a memorial to 8,400 Frenchmen buried here in 1870. The principal articles of commerce are leather goods, preserved fruit, poultry, corn, and wine. Known to the Romans as Divodurum, it was called Mettis in the 5th century, when it became the capital of the kingdom of Austrasia. It was frequently besieged, notably, and in vain, by the Emperor Charles v. in 1552. Metz remained in the possession of the French, to whom it was secured by the peace of West-phalia in 1648, until 1870, when it capitulated to the Germans. Pop. (1900) 58,462.

Meudon, tn., dep. Seine-et-Oise, France, 6 m. s.w. of Paris, has an astronomical observatory in the old eastle. Glass, ammunition, linen, and buttons are manufactured. The forest near by is a popular holiday resort. Chablais Park is used for experimental military ballooning. Rabelais was cure of Meudon. Pop.

(1901) 9,702.

Meulebeke, tn., prov. W. Flanders, Belgium, 4 m. s.w. of Thielt. It manufactures textiles and lace, has bleach works and oil mills. Pop. (1900) 9,185.

Meulen, ADAM FRANÇOIS VAN DER (1632-90), Flemish painter, was born at Brussels, but classed with the French school. Colbert appointed him battle painter to Louis xiv., and he followed the king in his wars, painting the battles and sieges in Flanders for the Château de Marly. Col-lections of his works are at Versailles and in the Louvre.

Meung, JEAN DE (c. 1250-1305), French satirist, surnamed Clopinel on account of his lameness; born at Meung-sur-Loire. He became a favourite of Philip le Bel because of his brilliancy and poetical gifts, but his satires procured for him the enmity of the court ladies. He continued Guillaume de Lorris's Roman de la Rose, and left a witty Testament.

Meunier, Constantin (1831-1905), Belgian realistic sculptor and painter. He was born at Brussels, and learned painting under Degroux, the painter of the poor, when twenty-six. When fifty, fired by Rodin, he took up his chisel and began a wonderful series of statuettes illustrating the life of the mining poor in Belgium. Sinister memories of the Belgian Black Country influence his work, even his sketches in Spain. Among his best statues Horse, The Shingler, and Fire Damp, in the Brussels Museum. See Life, in German, by Gensel (1905), and, in French, by Demolder (1902) and Lemonnier (1903).

Meurice, François Paul (1820-1905), French dramatic author, born at Paris. With Gautier and Vacquerie he produced Falstaff at the Odéon in 1842, and, with Vacquerie, Le Capitaine Paroles in 1843. Together with Dumas, in 1843. Together with Dumas, in 1847, he translated *Hamlet*; was chief collaborator in *L'Evênce* ment (1848), and assisted in the foundation of Le Rappel (1869).

Meursius, Johannes, or Jan De Meurs (1579-1639), Dutch scholar, born near the Hague. He became professor of history at Leyden in 1610, of Greek in 1611, and historiographer to the States-general. He was elected professor of history at Sorö in Denmark in 1625. His Commentary on Lycophron was written at the age of sixteen. His collected works (12 vols. 1743) include the 'Eleusinia' editions of the Greek

Meurthe-et-Moselle, dep. of N.E. France, forms the W. portion of the Lorraine plateau. Over a quarter of its surface is thickly wooded, and it is watered by the upper Moselle and the Meurthe. The Marne and Rhine canal connects both these rivers with the Rhine at Strassburg. The soil is generally fertile, and produces wine (especially around Toul), corn, sugar-beet, hops, and pota-toes. The department stands first in France for the production of rock-salt, and has valuable iron mines, which yield one-third of the French output. The very important manufactures comprise chemicals, and beer. Cap. Nancy. Arca. 2,036 sq. m. Pop. (1901) 484,722.

Meuse. (1.) Or MAAS, river which rises in French dep. of Haute-Marne, and flows mainly N.E., N., N.W., and W. for 500 m. past Commercy, Verdun, Sedan, and Mézières in France, Dinant, Namur, Huy, and Liège in Belgium, and Maestricht, Roermond, Venlo, and Gorinchem (Gorkum) in Holland, to join the Waal, the left arm of the Rhine. Beyond Gorkum the united stream again divides, the s. branch reaching the North Sea by the Hollandsch Diep's two arms, Krammer and Haringvliet; the N. branch, the

Merwede, subdivides beyond Dordrecht into the Old Meuse (Maas) and the North Channel. The latter joins the Lek, and the united stream forms the New Meuse, which reaches the sea beyond the Hook of Holland. The New Waterway, an artificial channel for ships for Rotterdam, runs parallel to and N. of the New Meuse from opposite the confluence of the Old Meuse. The river is navigable as far as Verdun, some 135 m. from its source. (2.) Department of N.E. France, forming part of Lorraine. It is intersected from N. to S. by the Meuse, and contains the headwaters of the Marne. The W. Argonne hills are clothed with forest, and E. of the E. Argonne hills lies the undulating and well-watered table-land of Woëvre. Horse-breeding is carried on, and potatoes and sugar-beet are grown. The lower hill-slopes are planted with vineyards (annual production about 9,000,000 gallons). The chief manufactures are iron and steel, glass, and paper. Bar-le-Duc is the capital. Area, 2,408 sq. m. Pop. (1901) 283,480.

Mexborough, tn., W. Riding, Yorkshire, England, on the Don. 51 m. N.E. of Rotherham; has iron works and brick and sanitary pipe works. Railway wheels and axles, glass bottles, and grindstones are manufactured. Pop.

(1901) 10,430.

Mexia, Pedro (1496-1552), Spanish historian, was born at Seville; the official chronicler of Charles V., whose spirited histories of his master's acts, and of the earlier emperors, were widely read and translated. Mexia's principal works are Historia Imperial y Cesarea (1547); La Relacion de las Comunidades de Castilla (1552); and La Jornada de Carlos V. a Tuncz. greatest work is Silva de Varia

Leccion (1543; trans. 1571).

Mexico. (i.) Country of N.

America, between the Gulf of Mexico and the Pacific, extending from the S. boundary of the United States to Guatemala and British Honduras, and including the peninsula of Lower California. Two great ranges, both called Sierra Madre, and con-nected with the mountains of California, run southwards, one near each coast, and gradually approach each other until they meet to the s. of Puebla. From 5,000 ft. in the N. they rise to 16,000 or 18,000 ft. near their junction. The triangular area junction. between these ranges, the plateau of Mexico, is divided into a number of basins small in area, and of great elevation in the The united range sinks down to low elevations in the isthmus of Tehuantepec. A third range, the Sierra Madre del Sur, runs through the states of Michoacan and Guerrero, and is continued into Guatemala. Another range forms the backbone of Lower California. Eruptive rocks form the loftiest peaks, such as Orizaba (18,700 ft.), the highest in the country, Toluca, Colima, and Popocatepetl. East and west the Sierras Madre slope in terraces to the coast, leaving only narrow strips of low land, especially to-wards the Pacific. Consequently the rivers are in general short, and of little use for navigation. The chief of the W. streams is the Lerma, or Rio Grande de Santiago, which, after passing through Chapala, the largest lake in Mexico, reaches the Pacific after a course of some 500 m. The Panuco, which flows past Tampico, is 400 m. long, and navigable for some distance; and the Papaloapam, entering the lagoon of Alvarado, and its tributary the San Juan, also afford navigable highways.

The temperature naturally varies with the altitude. In the Tierra caliente, up to about 3,300 ft., the mean in summer is from 77° r. to 88°, and in winter from 59° to 64°; the Tierra templada, up to 6,500 ft., has summer temperatures of from 59′ to 68°, and in winter of about 41°; still higher, in the Tierra fria, the thermometer falls in winter below freezing-p. int. In the valley of Mexico the climate is particularly agreeable. The rainfall averages 59 in. in the year, but is very un-

equally distributed. Tropical forests cover large areas in thes., yielding mahogany, logwood, and other products. Here is the region of cecoa (Seconusco in Chiapas), and sisal hemp is the chief product of Yucatan. Coffee is grown along the Pacific coast and in the province of Vera Cruz, which also yields excellent tobacco. Sugar and cotton are extensively cultivated, also silk and cochineal, indigo, and tropical fruits, india-rubber, gums and balsams, dye-woods and fibres. On the northern plains the vegetation chiefly consists of cactuses and other thorny plants.

Mexico, after the United States, is the greatest silver-producing country of the world, and considerable quantities of gold and copper are extracted. Iron, lead, antimony, bismuth, and many other metals exist, but have not received much attention. Coal, petroleum, and precious stones are also found. A number of fac tories and workshops are engaged in reducing ores, weaving cloth, distilling spirits, and preparing sugar, cotton, and fibres for export, but the manufacturing industry is not greatly developed. Minerals, fibres, coffee, and live stock are exported to the value

of over 20 millions sterling, the m. st important ports being Vera Cruz, Tampico, and Mazatlan; while the imports are valued at 8½ millions. Four railway lines run north across the United States boundary. The Tchuantepec Ry. connects the two oceans. In other parts the sierras are great obstacles to the extension of railways from E. to W.; they have, however, been crossed between Mexico and Toluca at a height of 10,600 ft

Of the total population 19 per cent, are of European race, 43 are half-breeds, and 38 pure Indians. The bulk of the population belong to the Roman Catholic Church, the connection of which with the state has been severed. Mexico

in the following year the French troops entered the capital, and proclaimed an empire under Maximilian of Austria. In 1867, however, they were compelled to evacuate the country, the empire was overthrown, and Maximilian was shot. The government is now a federal republic under a president, who is elected for four years, but is eligible for re-election. The legislative power is in the hands of a Chamber of Deputies (one member for every 40,000 inhabitants), and a Senate of fifty-six members (two for each of the twenty-seven states and the Federal District). See Cubas's Cuadro Geografico, Estadistico é Historico de los Estados Unidos Mexicanos (1884); Charnay's Ancient Cities of the



Mexico Cathedral.

possesses remarkable antiquities, such as the units of Mitla in Oajaca and Xochicalco in Morelos, and of Palenque in Chiapuz, and Uxmal in Yucatan. Area, 767,000 sq. m. Pop. (1900) 13,605,919.

At the beginning of the 16th

century the Spaniards discovered Yucatan and Mexico. In 1521 Cartez completed the conquest of the native Aztec kingdom, and Mexico continued to be a Spanish colony till 1822, when she asserted her independence from Spain, and established a federal republic (1824). In 1835 Texas gained her independence, and Mexico sustained a further loss in the cession of Upper California and New Mexico to the United States (1848). A European expeditionary force landed in 1862 to enforce satisfaction for wrongs and injustice done to foreigners, and

New World (1887); Bancroft's A Popular History of the Mexican People (1888), and Resources and Development of Mexico (1893); Gooch's Face to Face with the Mexicans (1890); Sainte-Croix's Onze Mois an Mexique et an Gentre-Amérique (1897); Seler's Auf alten Wegen in Mexico und Guatemala (1900); Mexico (Bureau of the American Republies, 1900); Lumholtz's Unknown Mexico (1903); Routier's Le Mexican (1905); and Southworth's The Mines of Mexico (1905).

(2.) State of the above country, in centre of Anahuac plateau. A part in the s.E. is occupied by the Federal District (area, 463 sq. m.). Th E., s., and centre are very mountainous, having some of the highest peaks in the country, such as Popocatepetl (17,000 ft.). There are small lakes—c.g. Texcoco—in

the E. The valleys are very fertile, and grain, coffee, sugar, and tobacco are cultivated. Stock is raised, and cotton and woollen goods, pottery and glass ware, are manufactured. Gold and silver mining are important. The capital is Toluca. Area, 9,247 sq. m. Pop. (1990) 924,457.

Pop. (1909) 924,497.
(3.) City, cap. of the republic of Mexico, stands in a beautiful elevated valley, in 19° 26′ N. and 99° 7′ w., and enjoys a most agreeable climate. It has wide streets, and many fine buildings. In the Plaza Mayor, commonly valled the Zealla where stead called the Zocalo, where stood the great square of the Aztec city, are the fine cathedral, municipal and national palaces, the last containing also the National Museum and Central Meteorological Observatory. Other buildings are the National Library, the university (opened in 1535 and closed in 1833), the Academy of Fine Arts, and many handsome churches. Two miles and a half to the s.w. is the hill of Chapultenec, where the Aztec emperor Montezuma had a palace. It is now occupied by the military school. A little further s. is Tacubaya (12,000 inhabitants), with an astronomical observatory and country houses of Mexican citizens. To the N.W. Mexican citizens. To the N.W. lies Guadalupe, the Lourdes of Mexico. The present city was founded in 1522 on the site of the Aztec capital, Tenoctitlan, then situated in the lake Texcoco. The water of the lake afterwards retired, but the valley was subject to serious inundations until a few years ago, when a canal was made to drain off the water by a tunnel through the hills of Acatlan. Alt. 7,410 ft. Pop. (1909) 368,898.

(4.) GULF OF, inland sea, between the United States on the N. and Mexico on the w. and s. The greatest length is 1,120 m.; the greatest breadth, 680 m. The only well-marked indentation is Campeachy Bay, between Mexico and the Yucatan peninsula. The Strait of Florida and the Yucatan Channel are shallow, but off the Mexican shores the depth increases rapidly to 2,000 fathoms. Between the mouth of the Mississippi and the Yucatan peninsula 2,119 fathoms have been sounded. A branch of the Gulf Stream enters from the Caribbean Sca, and leaves by the Strait of Florida. The Mississippi, Brazos, Colorado, Ric Grande, and Appalachicola are the chief rivers entering the gulf. The temperature of the gulf is from 8° to 9' higher than the

Atlantic in the same parallel.

Meyer, Conrad Ferdinand
(1825-98), Swiss novelist and poet,
born at Zürich. His historical
romances Jörg Jenatsch (1876),
Das Amulett (1873), Der Heilige

(1880), Die Richterin (1885), Die Versuchung des Pescara (1887), and his noems Battaden (1867), Gedichte (1882), and Hattens letzte Tage (1871) have appeared in many editions. See A. Frey's K. F. Meyer (1900); Langmesser's C. F. Meyer (1905); and Memoiren by his sister (1903).

Meyer, HANS (1858), African traveller, was born at Hildburghausen; explored the interior of German E. Africa, ascending Mt. Kibo (Kilima-Njaro) in 1886. Two years later, on another expedition, he was captured by Arabs, but released for a large ransom. He reascended Kibo (1889). In 1903 he explored the Cordillera of Ecuador. His works include Eine Weltreise (1884), Zum Schnecdom des Kilima-Ndsharo (1888), and Ostafrikanische (iletscherfahrten (1890).

Meyer, Heinrich August Wil-Helm (1800 73), German excecte, was born at Gotha. His great work is the Kritisch-exegetisches Commentar über das N.T., in the preparation of Mileh he had the co-operation of Lünemann, Huther, and Düsterdieck. It is remarkable for its combination of clear conviction with rigorous science and great perspicacity of expression. There is an English translation in 20 vols., Critical and Exegetical Commentary on the New Testament (1873-82).

Meyer, JOSEPH (1796-1856), German publisher and industrial organizer, was born at Gotha. Under the name of 'Das Bibliographische Institut' he founded a publishing house at Gotha in 1828; this business his son transferred to Leipzig in 1874. He inaugurated several new departures in publishing, notably the issue in various 'libraries' of the works of the great German writers at low prices and in serial numbers. His firm issues also the excellent Meyers Konversations-Lecikon.

Meyer, Lothar Julius (1830-95), German chemist, was born at Varel in Oldenburg. After working under Bunsen at Heidelberg, he became (1859) assistant professor in Breslau; in 1866 professor of natural sciences at Eberswalde; in 1868 professor at Karlsruhe Polytechnicum; finally, in 1876, succeeding Fittig in the chair of chemistry at Tübingen, where he remained till his death. Lothar Meyer's chemical work covers a wide ground, the most important being his investigation on the natural system of classification of the elements, and his recalculation of the atomic weights. His principal books are Die modernen Theorien der Chemie (1861; Eng. trans. 1888), and Die Atomgewichte der Elemente (1883). See Bedson's 'Memorial Lecture' in Jour. Chem. Soc. (1896), p. 1403.

Meyer, Paul (1840), Romance philologist, was born at Paris; became professor of South European languages and literatures at the Collège de France (1869), and of remance philology at the Ecole des Chartes in Paris (1876). In 1882 he was appointed director of the latter institution. He founded the review Romania in 1872, together with Gaston Paris. His scholarship and literary abilities are of the highest order. His knowledge of mediaval MSS. is probably unrivalled, and his reports (such as those on old French Mss. in English libraries) are models of their kind.

Meyer, Victor (1848-97), German chemist, was born at Berlin, and studied chemistry under Bunsen, afterwards becoming his assistant. In 1863 he began working with Baeyer in Berlin, where he remained till he became assistant to Fehling in Stuttgart. He was appointed professor in the Zürich polytechnic in 1872, in Göttingen in 1885, and finally succeeded Bunsen in Heidelberg in 1889. Victor Meyer did important work in organic chemistry, notably on the nitro-derivatives of the fatty series, and in discovering the oximes and thiophene. He is, however, best known for his displacement method of determining vapour densities, which he applied to the elucidation of the phenomenon of dissociation. He also investigated the temperatures of combination of gaseous mixtures

and the melting-points of salts. Meyerbeer, Giacomo (1791-1864), German musical composer. born in Berlin. When only nine years of age he was considered one of the best pianists in Berlin. He became (1810) a pupil of the Abbé Vogler at Darmstadt. Proceeding to Venice in 1815, and adopting the Italian style, he composed a number of operas, among them Romilda e Costanza (1815), Semiramide Riconosciuta (1819), Emma di Resburgo (1819), and Margherita d'Anjou (1820), all of which met with immediate success in Italy. His opera Crociato, produced in Venice (1824), created a great sensation. Subsequently he took up his residence in Paris; but after 1842, when he was appointed general music-director by the king of Prussia, he had to spend works which firmly established Meyerbeer's reputation as a great dramatic composer are Robert le Diable (1831), Les Huquenots (1836), Le Prophète (1849), L'Etoile du Nord (1854), Dinorah (1859), and L'Africaine (1864), first performed in 1865. Meyerbeer's orchestration is extremely brilliant. He was also the composer of an oratorio and a large number of cantatas and songs. See Pougin's G. Meyerbeer (1864).

Meyer-Lübke, WILHELM (1861), Romance philologist, was born at Dübendorf (canton of Zürich); studied under Tobler and Gaston Paris; became professor of Romance languages at Jena (1887), and then at Vienna (1890). His magnum opus is a historical grammar of the Romance languages (3 vols. 1890-9, index, 1902; Fr. trans. by Rabiet, 1890, etc.). Meynell, ALICE CHRISTIANA (née THOMPSON) (c. 1853), English

poetess and essayist, was born in London, and spent the greater part of her youth in Italy. She was married to Wilfrid Meynell in 1877. Her first publication was a book of poems, *Preludes*, in 1875, some of the contents of which were incorporated in a later volume, Poems, in 1893. Later Poems fol-lowed in 1902. For the rest, Mrs. Meynell's original work has been mainly in the form of prose esmainly in the form of prose essays, including The Rhythm of Life (1893); The Colour of Life (1896); The Children (1896); London Impressions (1898); The Spirit of Place (1898). She has also published a Life of Ruskin (1898). (1900), and an anthology of poems, The Flower of the Mind (1897). Her Preludes won the approbation of Ruskin, Rossetti, Tennyson, and Browning. There was remarkably little trace of immaturity in the poems; and their peculiar charm, springing largely from simplicity of expression, has been retained in her later work.

Meyrick, SIR SAMUEL RUSH (1783-1848), English lawyer and antiquary, was bornin London. He practised in the ecclesiastical and admiralty courts. He was a great authority on armour, of which he had a magnificent collection. His great work, European Armour, appeared in 1824, and History and Antiquities of Cardigan in 1810. He edited Dwnn's Heraldic Visitation of Wales (1810), and contributed to Archeologia.

Mezereon, the popular name given to the little shrub Daphne mezereum, whose fragrant, rosy flowers are so welcome in February and March, before the leaves appear. The flowers are borne on the previous year's growth, and are followed by bright red berries.

Mézières, fort. tn., cap. of dep. Ardennes, France, on the Meuse, 11 m. w. v. w. of Sedan, has copper foundries and ammunition factories. In 1521 Bayard defended Mézières against the imperialists. Pop. (1901) 7,884.

Mézières, Alfreid Jean Fran-Cois (1826), French literary historian, was born at Rehon (Moselle). He became professor of foreign literature at the Sorbonne in Paris (1863), and in 1874 was elected a member of the Academy. He has written Shakespeare (5th ed. 1893); Prédécesseurs et Contemporains de Shakespeare (4th ed. 1894); Contemporains et Successeurs de Shakespeare (4th ed. 1897); Goethe, les Œuvres expliquées par la Vie (3rd ed. 1895); and Vie de Mirabeau (1891).

Mezötur, tn., Hungary, 80 m.

Mezotur, tn., Hungary, 80 m. s.e. of Budapest; manufactures pottery. Pop. (1900) 25,367.

Mezquite, two species of trees or shrubs belonging to the genus Prosopis, a subdivision of the order Leguminosæ. The common

professor of Oriental languages at Bologna, and librarian to the university (1815). On account of his extraordinary gift for languages (he understood and spoke fiftyeight), he became canon at St. Peter's and chief keeper of the Vatican library (1833-8), and cardinal (1838). See *Life* by C. W. Russell (1857), and, in German, by Mitterrutzner (1885).

Mezzo-soprano, in singing, the female voice which comes



Copy of a Mezzotint—'Mrs. Carnac,' by J. Raphael Smith.
After Sir Joshua Reynolds.

mezquite (P. glandulosa) is a spring shrub, common in Mexico and Texas. It yields a gum which resembles gum-arabic in qualities. The curly mezquite, or screw bean (P. pubescens) is a N. American native. The pulp contained by its pods is sometimes eaten by the Indians,

Mezzofanti, Giuseppe (1774-1849), Italian cardinal and linguist, bornat Bologna; appointed

between the contracto and the soprano. Its range is indefinite, and its nomenclature is determined more by its timbre than by its compass.

Mezzotint, a method of engraving upon metal in which the surface of the plate (copper gives the finest results, but steel is now greatly used) having been covered with a close network of crossed lines (making a burr all over,

which, before being worked upon by the engraver, would, if inked, print a uniform dark tone), the half tones are obtained by scraping the roughened surface partially and in different degrees away, and the high lights by scraping it away completely and polishing the parts. The 'ground' is produced by a blunt chisel-like instrument, with a serrated cut-ting edge, called a 'rocker,' and the tools used in engraving are the scraper and burnisher. Mezzotint was invented by Ludwig von Siegen, about 1642, and introduced into England by Prince Rupert. It soon became a favourite method with English engravers, who, more than all others, have excelled in the art. J. Faber, junior, were the best of the 17th and early 18th century mezzotinters; but the art reached its highest development in portraiture, for which it is specially adapted, after 1750, when Macardell, J. Raphael Smith, Earloin, and others en-graved many of the finest pic-tures of Sir Joshua Reynolds and his contemporaries. A little later C. Turner and S. W. Reynolds also did remarkable work in this method. In landscape, the finest results were achieved by David Lucas in a series of splendid plates after Constable. Towards the middle of the 19th century mezzotint was less in request, and it was not until recent years, when the fashion of collecting prints by the older masters set in, that there was any real revival of the art. See Mezzotints, by Cyril Davenport (1903).

M.F.H., Master of Foxhounds. Mfumbiro, dist. of volcanic mountains from 11,000 to 13,000 ft. high, the s.w. limit of British E. Africa, to the w. of Victoria Nyanza, and between Lake Kivu and Albert Edward Nyanza.

Mho, a term introduced by Lord Kelvin for the measurement of electric conductivity or conductance. It is the reciprocal of the ohm, so that a resistance of 4 ohms is a conductance of 25 mho.

Mhow, tn. and cantonment, Indore state, Central India, 13 m. s.w. of Indore, near the Vindhya range (alt. 1,900 ft.). Pop. (1901) 36,039.

M.H.R., Member of the House of Representatives.

Miagao, tn., prov. Iloilo, Panay, Philippines, 22 m. w. of Iloilo; manufactures hemp. Pop. (1898) 22,100.

Miail, EDWARD (1809-81), English politician and apostle of disestablishment, born at Portsmouth. In early life pastor of the Congregational Church, he came to London (1841), and founded the Nonconformist newspaper. Became the leader of the

political dissenters.' He was M.P., for Rochdale (1852-7) and Bradford (1869-74), and twice moved a resolution in favour of the disestablishment of the English Church. See *Life* by A. Miall (1884).

Miami, Algonquian tribe, occupying, about 1660, S.W. Wisconsin. They played an important part in the colonial wars, but after 1812 they were thoroughly broken, and removed to Kansas.

Miani, or MEEANEE, vil., Sindh, Bombay, India, on the Indus, 6 m. N. of Haidarabad; scene of the defeat of the Baluchis by Sir Charles Napier on Feb. 17, 1843.

Miao-tse, or MIAU-TSI, collective name applied in a contemptuous sense by the Chinese to the semi-independent aboriginal tribes occupying the mountainous districts in S.W. China.

Mica, a group of minerals, which readily split up into thin flakes owing to their perfect cleavage. Muscovite, a clear colourless potash mica, may be obtained in plates two feet in diameter, perfectly transparent and flex-ible. It was formerly used for glazing windows, and known as Muscovy glass, and is still employed (under the name of talc) for lamp chimneys and gas stoves. These scales of mica are flexible and elastic, properties possessed by no other mineral. The micas have a vitreous or pearly lustre, their colour ranging from black (biotite) to brown (lithionite), violet (lepidolite), yellow, green (fuchsite), and colourless. They (fuchsite), and colourless. are all complex silicates of aluminium along with iron, magnesia, or the alkalis.

Micah, one of the twelve 'minor' prophets, was the younger contemporary of Isaiah, Hosea, and Amos, and prophesied in the reigns of Jotham, Ahaz, and Hezekiah, kings of Judah. In the opening verse of his book he is called a Morashtite (Morasthite)-i.e. probably a native of Moresheth-Gath, a place on the borders of Judah and Philistia. His work shows the usual features of pre-exilic prophecy—stern de-nunciation of Israel (in both kingdoms) for its idolatry, injustice, and cruelty (cf. ch. 1-3, 6), followed by promises of restoration (4, 5, 7). It is admitted by most critics that the various prophecies of Micah are in a confused state, and that there are interpolations. He insists much upon the moral aspects of the covenant: witness the sublime passage 6:6-8; and he particularizes Bethlehem as the place of the Messiah's origin (5:2, cf. Matt. 2:6). The section 4:1-5 is a replica of Isaiah 2:2-5, but scholars differ as to which is the original. The diction of Micah is often abrupt and very dramatic, and he displays a tendency to make word-plays upon proper names (1:10 f.). See commentaries by Reinke (1874), Cheyne (Camb. Bible), Nowack (Handkom.), G. A. Smith (Expos. Bible). See also W. R. Smith's Prophets of Israel, 287 ff. (new ed. 1895).

Mica-schist, a finely schistose or fissile rock, composed of alternating thin, wavy, or irregular bands of mica and quartz. It is a typical metamorphic rock, and covers wide areas where the older strata come to the surface. Garnet, tourmaline, felspar, kyanite, and other minerals are frequent in mica-schist.

M.I.C.E., Member of the Institute of Civil Engineers.

Michael, one of the seven archangels. According to Dan. 10:21, 12:1, he is the guardian prince of Israel, and the New Testament allusions Jude 9; Rev. 12:7) bear out this view of his character and function. In the apocryphal and apocalyptic books he is the recording angel, the angel of revelation, and even the intercessor for mankind. See Angel, Archangel.

Michael, THE BRAVE (1558-1601), voy vode of Walachia, Moldavia, and Transylvania. His first action on ascending the throne (1593) was to throw off the suzerainty of the Turks, and after several engagements he forced them to recognize his independence. In 1599 he invaded Transylvania, and defeated and dethroned Andreas Bathori, and in 1600 took possession of Moldavia. A coalition of the Poles and Transylvanians compelled him, however, to seek for assistance at Vienna, and with the aid of the imperial general Basta he defeated his Transylvanian rival Sigismund Bathori (Aug. 3, 1601), but was assassinated by Basta's

orders at Torda, Aug. 19, 1601.

Michaelis, Johann David
(1717-91), one of the founders of modern Biblical scholarship, was born at Halle. In 1746 he was called to a chair of philosophy at Göttingen, which, together with that of Oriental languages (added in 1750), he occupied till his death. Besides his exceptical paraphrase of the whole Bible (Old Testament, 13 vols.; New Testament, 4 parts), he issued an Abhandlung von den Ehegesetzen Mosis (1755), Mosäisches Recht (1770; trans. 1810), Supplementa ad Lexica Hebr. (1786), a revision of Lowth's De Sacra Poesi Heb., and an Introduction to the Bible (New Testament, 1750; one division of Old Testament, 1787). He was the son of Christian Benedikt Michaelis (1680-1764), and the grand-nephew of Johann Heinrich Michaelis (1668-1738), both distinguished Orientalists Johann of their time. See Autobiography (1793).

Michaelmas, or the feast of St. Michael, when used as a date, means old Michaelmas, the 29th September, and not 11th October, according to the new style. (See 24 (eo. 11. c. 23, the act rectifying the Julian calendar.) See also Terms.

Michaelmas Daisy. See

ASTER.

Michaud, Joseph François (1767-1839), French poet and historian, born at Albens, Savoy. He went (1791) to Paris, where he started a royalist paper, La Quotudienne (1794). Forced to flee from Paris, he wrote his best known poem, Printemps d'un Proserit (1804). He was appointed press censor by Louis XVIII. (1815). His chief work is Histoire des Croisades (1811-22). With Poujoulat he edited Collection de Mémoires pour servir à l'Histoire de France (32 vols. 1836-9).

Michaud, Louis Gabriel (1772-1858), French litterateur, brother of the preceding, born at Bourg. He entered the army, being present at the battles of Jemappes and Valmy, but resigned (1797). He published Histoire de Saint-Simonisme et de la Famille Rothschild (1817), and, with his brother, Biographie Moderne (1805-7), and Biographie Universelle (1811-28).

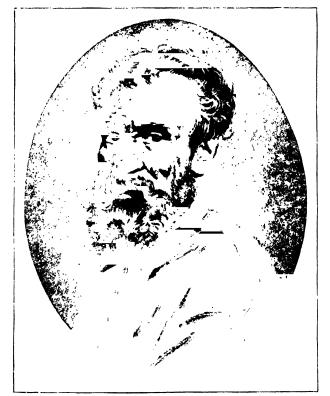
Michel, Francisque (1809-87), French antiquary, born at Lyons, Professor of foreign literature at Bordeaux (1839), he published many crudite works on Anglo-Norman history—Les Ecossais en France et les Français en Ecosse (1852), and also, in English, A Critical Enquiry into the History of the Scottish Language (1882).

Michel, Louise (1833 1905), French anarchist, born at Vroncourt (Haute-Marne); came to Paris as a teacher (1856); fought at the barricades during the commune (1871); was taken prisoner and sentenced to death, but was transported to New Caledonia. Returning after the general amnesty (1880), she again suffered imprisonment (1883-6) for political offences. She published several novels, and Mémoircs (1886).

Michelangelo, or MICHAEL Angelo, Buonarroti (1475-1564), Italian sculptor, painter, architect, military engineer, poet, the culminating genius of the renaissance; the first great modern sculptor, inasmuch as he penetrated through the sense of beauty in outward form and contour to the energizing motives of passion, emotion, and movement in the human being. Primarily the sculptor, his vision as a painter was expressed by form and line, was architectural in composition, grand in style, with little feeling for the expressional value of colour as such. To him the service of beauty was a religion. He imposed his personality upon his age, and the influence of his

work has been potent to the present day. The son of a poor gentleman of Florence, Michelangelo was born at Caprese. His father apprenticed him to the painter Ghirlandajo (1488), whom he aided with the frescoes in Sts. Maria Novella. Later, Lorenzo the Magnificent took him to his house. There he met the most eminent men of the day, listened to discourses on Plato and poetry, and heard of GrecceandColumbus. Signorelli, Botticelli, Leonardo da Vinci—whose B. Ule of the Standard

St. Peter's, the first example of his grand style, a harmonious realism at variance with the Greek spirit. He was in Florence in 1501-5, carved the famous statue of David, painted The Holy Family of the Tribune and the Manchester Madonna (National Gallery). He and Leonardo were commissioned in 1504 to decorate the great council hall at Florence. Both artists designed cartoons that have perished. Vasari declares that the figures in Michelangelo's Soldiers Bathing (engraved by Marc Ansach



Portrait of Michelangelo. Painted by himself.

strengthened his natural tendency to the expression of movement in art—Perugino, Titian, were among his contemporaries. In Lorenzo's school, which contained a priceless collection of antiques, he found his vocation; got marble, and struck out the Frun's Mask (in the Bargello), and his first bas-relief, The Battle of the Centaurs. On the fall of the Medici he fled to Bologna, and in 1496 to Rome. To this period belong the Cupid in the South Kensington Museum, and the Pièta in

tonia and A. Veneziano) were of divine, not human, origin. Pope Julius II. summoned him to build him a mausoleum in St. Peter's. Through forty years of opposition and obstacles, aptly called the 'Tragedy of the Sepulchre,' he struggled with, yet never completed, this design: of it there exist only the Moses (Rome) and The Bound Captives (Louvre). In 1508 Julius 17. whose mind, according to Vasari, was poisoned by Bramante against the sculptor, commissioned him to decorate the ceiling of the Sistine



A colossal statue by Michelangelo 'David.' (Florence.)

Chapel; thus to rivalry we owe that marvellous series of fresarchitecturally designed, filled with mighty forms, inexhaustible in symbolic language of the human figure. Leo x. sent him for six years to excavate marble from quarries for the building of the façade of St. Lorenzo, Florence. In 1524, under Clement VII., he designed the Laurentian library and the fa-mous Medici tombs with the grand figures of Day and Night, Dawn and Twilight, completed by 1536. Further interruptions arcse from the distracted state of Italy, and in 1529 he was appointed com-missary general of the fortifica-tions of Florence. In his sixtieth year he was commissioned by Paul III. to paint the Last Judgment in the Sistine Chapel, a spiritual drama reflecting the painter's mental attitude towards the religious dissensions that were rending Christendom at the beginning of the reformation. Michelangelo never had a free hand to work as he listed; his life was a continual struggle with patrons, against enemies and circumstances. A lover of simplicity and solitude, he lived in the midst of intrigue and treachery. In 1517 he was appointed chief architect of St. Peter's, where he worked without a salary, a labour of love to God. To him are due the proportions of the grand dome and the structural security of the enormous building. He also converted the baths of Diocletian into the church of Sta. Maria degli Angeli, and rearranged and partially built the present group of buildings on the Capitol. To his last period belong some of his finest drawings and most of his sonnets. Several English collections are rich in his drawings, especially those of Windsor and the University of Oxford. Despite his aloofness from women. his finest sonnets are those written to Vittoria Colonna, the widow of the Marquis of Pescara, with whom a fine and solacing friendship lasted till her death (1534-These sonnets (1623; best ed. Frey, 1897), 'torn from the language as he tore statues from stone,' are the best commentary on his solitary life. See Leben Michelangelos, by Grimm (10th ed. 1901; Eng. trans. 1895); The Life of Michelangelo, by J. A. Symonds (3rd ed. 1898); Sonnets of Michelangelo and Campanella. of Michelangelo and Unmpanella, by J. A. Symonds (1878); Life and Work of Michelangelo Buonurroti, by C. Heath Wilson (1876); Michelangelo, by Knackfuss (7th ed. 1903), by Holroyd (1903), and by Lord Ronald Gower (1903); Michelangelo und das Ende der Renaissance, by Thodd (1902-2). der Renaissance, by Thode (1902-3); Lettere di Michelangelo Buonar-

roti, ed. by G. Milanesi (1875); Life of Michel Angelo Buonarroti, by John Harford (1857, 2 vols.); Illustrations, Architectural and Pictorial, of the genius of Michel Angelo, by Canina, C. R. Cockerell, and John Harford (1857).

Michelet, Jules (1798-1874), French historian, was born at Paris. When a youth he contracted strong liberal opinions and a violent hatred of the Jesuits. From 1821 to 1826 he held the professorship of history, of ancient languages, and of philosophy at the Collège Rollin, and in 1827 was made mattre de conférences in the Ecole Normale. After the establishment of the liberal monarchy of Louis Phi

turned his attention to philosophy and natural history. His Euvres Complètes appeared in 40 vols. (1893-9). See his Ma Jeunesse (1884) and Mon Journal (1888); Lives in French by Monod (new ed. 1905) and Brunhes (1897); and Madame Quinet's Cinquante Ans d'Amitté (1900).

Michelet, KARL Ludwig (1801-

Michelet, Karl Ludwig (1801-93), German philosophical writer, born at Berlin; was professor of philosophy at the university there (1829-93). In 1828 he published Das System der Philosophischen Moral (1828), and wrote several other works on philosophy. An ardent follower of Hegel, he collaborated (1832-42) in the publication of Hegel's complete works.



Michigan State and Lake.

lippe, Michelet was appointed chief of the historical section of the archives of France. At the same time he delivered famous lectures at the Faculté des Lettres. In 1851 the government of the second empire removed him from all his posts. His most remarkable works are Histoire de France (18 vols. 1833-66); Histoire de la Révolution Française (7 vols. 1847-53); Du Prêtre, de la Femme, de la Famille (Eng. trans. 1846); Les Jesuites (Eng. trans. 1846); La Sorcière (Eng. trans. 1863). The picturesqueness of his style and his brilliant generalizations rendered all the above works very popular. After 1851 he

Michel Nicolaievitch (1832), Russian grand-duke, prince, and general, brother of the Czar Alexander II., was born in St. Petersburg. He was appointed general, grand-master of cavalry, and governor-general of the Caucasus (1863); and in the Russo-Turkish war (1877) he took Ardahan and Kars, and was made a field-marshal. He has also filled the positions of director-general of artillery and president of the Council of the Empire.

Michigan. (1.) Northern state of U.S.A., with an area of 58,915 sq. m. It was organized as a territory in 1805, and admitted as a state in 1837. It is divided

into two parts, known as the Upper and Lower Peninsulas, separated by the Strait of Mackinac, which connects Lakes Michigan and Huron. The sur-Lakes face presents little relief, and contains numerous lakes and marshes, the result of the inva-sion of the Laurentian glacier. The capital is Lansing, in the Lower Peninsula, and the chief city is Detroit. Agriculture is in great part confined to the s half of the Lower Peninsula. live-stock interests are important The manufactures yield lumber, flour, foundry and ma-chine-shop products, furniture, planing-mill products, carriages and wagons. The lumber indusand wagons. The lumber industry is rapidly declining, owing to the depletion of the forests. The mineral resources consist mainly of iron ore, copper, and salt. Iron is found on the Upper Peninsula, mainly in the Marquette Range, and occurs in enormous bodies of very pure hæma-tite. Copper is found on Keweenaw point, on the Upper Peninsula. Salt is obtained from springs on the Lower Peninsula. A little of the iron ore is smelted at Detroit, but the greater part goes to Cleveland and Pittsburg. In copper production the state stands next to Montana. The population in 1900 was 2,420,982; the foreign-born numbered 541,653, or 22.4 per cent. of the whole population. (2.) Lake of U.S.A., one of the chain of great lakes, the second in size in, and the only one lying wholly within, the United States. The shores are low and sandy. The lake, which is subject to violent storms, communicates with Lake Huron by the Strait of Mackinac, and there is connection with the Mississippi by two canals. The islands which are in the N. portion form the Manitou Archipelago (largest, Manitou Archipeing.
Beaver I., 50 m. long). There shore stands Chicago. Altitude above sca-level, 582 ft. Area of lake, 22,400 sq. m. Length, 300 m.; mean breadth, 75 m.; mean depth, over 870 ft. (3.) City, Laporte co., Indiana, U.S.A., at s. end of Lake Michigan, 45 m. s.E. of Chicago. Chief manufactures: railroad cars, chairs, hosiery, and lumber. Pop. (1900) 14,850. Michigan University is situ-ated at Ann Arbor, Michigan,

Michigan University is situated at Ann Arbor, Michigan, U.S.A. It was founded in 1837 and opened in 1841. The colleges of literature, science and the arts, and engineering were opened in 1853, of medicine and surgery in 1850, of law in 1859, of homœopathic medicine in 1875, and of dental surgery in 1875. The university was the pioneer of co-education, women being first admitted in 1870. In 1904-5 the students numbered 4,136.

Michoacan, state of Mexico, bordering the Pacific for 100 m. in the s.w., with the state of Mexico on the E. It covers an area of 22,874 sq. m., and is very mountainous, the s. part being of lower elevation and sloping towards the coast. The lakes, particularly Cuitzeo and Patzeuaro, are large. There are rich gold and silver mines. Copper, iron, and coal are also worked. Grain, sugar, coffee, and tobacco are cultivated. The capital is Morelia (old Valladolid). Pop. (1900) 335,849.

lid). Pop. (1900) 335,849.

Micipsa, king of Numidia in ancient Africa. He succeeded his father Masinissa, and reigned from 148 to 118 B.C. He was on good terms with the Romans, whom he assisted with auxiliary troops both against Viriathus in Spain (142 B.C.) and against Numidians of the state of the st

mantia (133 B.C.).

Mickiewicz, ADAM BERNARD (1798-1855), Polish poet, was born at Zaosie, near Novogrodek in Lithuania. He early composed his Ode to Youth (Oda Od Mlodosci) and his 'ballads,' which enjoy great reputation among his countrymen. In 1824, owing to secret societies among the stu-dents, he was compelled to leave the University of Wilna, and ordered to reside in Russia. While in that country he composed Konrad Wallenrod (Eng. trans. 1882) and the Sonnets. In 1829 he left Russia, visited Germany (where he had an interview with Goethe), Switzerland, and Italy, and finally took up his abode at Paris. It was there that appeared in 1834 his longest and most celebrated poem, Pan Tadeusz (Eng. trans. 1885), which gives a picture of Polish life at the time of the invasion of Russia by Napoleon in 1812. In 1839 he received an invitation to Lausanne as professor of Latin literature, but next year he was brought back by his appointment to a newly-founded professorship of Slavonic literature in the Collège de France. But he soon rendered himself obnoxious to the government by the political discussions which he introduced into his lectures. In 1852 Prince Napoleon procured for him the post of librarian at the Arsenal. In 1855 he was sent to Constantinople to assist in forming a Polish legion in the pay of Turkey to serve against Russia, and died there of cholera. He was buried in the cemetery at Montmorency; but in 1890 his remains were brought to Cracow. Mickiewicz is the national poet of Poland. He has embodied in his verses the passionate utterance of her hopes, her sufferings, and her mysticism. With the skill of a consummate artist he has interwoven with his poetry the traditions of

Poland and the most striking passages of her history. He is also a great painter of nature. A complete edition of his works appeared in 1880-5. See V. Mickiewicz's Adam Mickiewicz, su Vie et son Œuvre (1888).

Mickle, WILLIAM JULIUS (1734-88), Scottish poet, born at Langholm, Dumfriesshire. He settled in London in 1763, and in 1765 became corrector to the Clarendon Press, Oxford. Leaving the Clarendon Press, he translated the Lusiud of Camoens into English verse (1775), with a Life of Camoens. In 1779 Mickle was secretary to Commodor Johnston in the Rodney man-of-war, sailing with a squadron to Portugal, and became a member of the Royal Academy of Portugal. He also wrote a charming ballad. Cumnor Hall, for Evans's Old Ballads (1777-84). He may have written There's nac Luck about the Hoose, but this is uncertain. Managers declined his drama, The Siege of Marscilles (1771). A fine poem, Almada Hill, an Epistle from Lisbon, appeared in 1781. John Sim wrote a Life for a complete edition of the Poems issued in 1807.

Micmacs, North American aborigines, an eastern branch of the Algonquian family, who formed the dominant element in Nova Scotia, Prince Edward I., New Brunswick, and adjacent parts. They number about 4,000. They remained faithful allies of the French throughout the colonial wars. The tribal name is properly Mikwak or Mikwanak. They are credited with a writing system of unknown origin, and possess a rich folklore, apparently showing reminiscences of former contact with the first Norse settlers in N. America.

Micon, a native and painter of Athens, lived about 460 B.C. He painted the Battle of Theseus and the Amazons which adorned the Stoa Pacile at Athens, and had a hand in the painting of the Battle of Marathon in the same place. Paintings of his decorated the temple of Theseus. He was particularly skilful in painting horses, and was also a sculptor.

Miconia, a genus of tropical shrubs and trees belonging to the order Melastomaceæ. They hear corymbose panicles of red, white, or yellow flowers.

Microbe, MICROCOCCUS, See BACTERIOLOGY.

Microcachrys, a genus of evergreen shrubs belonging to the order Coniferæ. The only species is the Tasmanian M. tetragona, the so-called strawberry-fruited cypress. It is of prostrate habit and greenhouse requirements.

Microcline, a potash felspar which crystallizes in oblique crystals (h. = 6, sp. gr. 2.5), very similar to those of orthoclase. It is very abundant in many granites. Its distinctive characteristic is the very minute and complex twinning, which gives thin flakes of it a cross-hatched appearance in polarized light.

Microcosm, MACROCOSM, in the language of the philosophic schoolmen meant man (the little world) and the universe (the great world) respectively. The germ of the idea is found in Pythagoras, Plato, and the Stoics, who looked on the world as a complete entity, endowed with hody and soul, and who tried to find in man the same phenomena as in nature.

Microcosmic Salt, sodium ammonium phosphate, NaNH₄, HPO₄, 4H₂O, is so called from its formation in the human body, from which it is excreted in urinc. It is prepared by crystallizing together solutions of sodium and ammonium phosphates, and forms colourless monoclinic crystals. When strongly heated, it loses water and ammonia, forming a glassy residue of sodium metaphosphate, which is used as a blowpipe reagent.

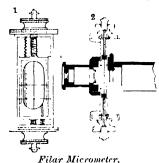
Microhm. See Ohm.

Microlestes, a genus founded on a small multituberculate tooth from the Rhætic bone-bed of Somersetshire, and supposed by some palæontologists to belong to a primitive marsupial or monotreme mammal, but by others assigned to the reptiles.

Microliths. Crystals of very small size, a thousandth of an inch or less in length, are frequently seen in microscopic sections of rocks and slags. They are known generally as microliths. Some are of perfect shape, and their nuture is determinable from their outlines and their optical properties. Usually, however, they are hollow, branched, or forked, curved (trichites), dumbbell shaped, etc. The simplest of all are very minute globular bodies (cumulites), which may be arranged in rows (margarites). Microliths are often grouped in networks, tree-like structures, radiate masses (spherulites); and such 'skeleton-growths' may subsequently have their interstices filled up to form solid crystals.

Micrometer, an astronomical instrument for mensuring small arcs in the field of a telescope. The original form given to it by its inventor, William Gascoigne, about 1638, is substantially that still in prevalent use. The 'filar micrometer' contains two sets of spider-lines crossing at right angles, arranged on sliding frames in the common focal plane of the object-glass and the eye-glass. The angular distance apart of two adjacent objects, such as the com-

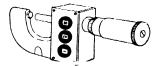
ponents of a double star, can be determined by their bisection respectively with a pair of wires, the amount of motion given to which for the purpose is read off on a scale attached to the finely-



1. Front view, showing spider-lines. 2. The instrument in position, sectional view.

cut screw actuating them. Since Herschel's time a 'position-circle' has been added for the purpose of fixing the direction with regard to the hour-angle of the line joining the objects under scrutiny. Their 'position-angle' (as it is called) is learned by rotating the entire apparatus in a plane perpendicular to the optical axis of the telescope until they are aligned between two close parallel threads, when the angle of rotation is read on a fixed graduated circle. Savary devised, in 1743, the 'double-image micrometer,' best known in the special shape of the heliometer. On a similar principle Ramsden imagined and Dollond, after 1819, constructed 'dioptric' micrometers, in which the rays from the object-glass are intercepted, before reaching the

proposed the use for micrometrical purposes of the two images furnished by double refraction, the end being attained by the insertion of a Rochon's prism between the object-glass and the eye-glass. And George Dollond added, in 1821, the improvement of substituting for the eye lens a sphere of rock-crystal, by the rotation of which through a measured angle corresponding and inverted coincidences of the double images afforded by it could be brought about. In Fraunhofer's 'ring micrometer,' and in the 'declinometers' used by Argelander and Bond, the diurnal motion was turned to account for determining star positions, and the principle is frequently availed of in cometary observations. Burton and Grubb designed in 1880 a 'ghost micrometer,' in which the measuring lines were shown by reflection. See Lee's The Microtomist's Vade-Mecum (1900), and Gill's 'Micrometer,' Encyc.



Micrometer (direct reading) for Engineers.

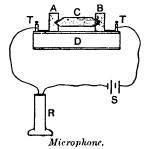
Brit., vol. xvi. Micrometer is also the name of a small gauge or caliper used by engineers. Instruments are made to read in thousandths and even in ten-thousandths of an inch.

Micronesia (= 'small islands'), that section of the Pacific which extends, mainly in a W. to E. direction, from about 130° to 180° E. between the equator and 20° N.



Micronesia.

eye, by a divided lens; and Sir George Airy described in 1838 (Cambridge Phil. Trans., vol. ii.) a 'divided eye-glass micrometer,' with which good results were obtained. In 1801 the Abbé Rochon and comprises, going eastwards, the Ladrone or Marianne, Pelew, Caroline, Marshall, and Gilbert or Kingsmill archipelagoes. For details, see the several entries. The natives of these sextered groups are an extremely mixed branch of the Oceanic peoples. The original substratum was most probably Papuan or Melanesian, and this was successively fol-lowed by Polynesians, especially in the eastern and central groups (Gilbert, Marshall, Caroline), where they are now dominant; by Malayans (mainly from the Philippines) in the Ladrones; and by Chinese and Japanese sporadically in all the western groups. The colour ranges from a deep mahogany to olive and various shades of brown, and the height from 5 ft. 4 or 5 in. to 5 ft. 10 in. or even 6 ft. But a certain unity is imparted to all Micronesians by the hair, which is almost everywhere long, lank, or wavy, and black; and by their languages, which are members of the Malayo-Polynesian family.



Microphone, an instrument used in the observation of minute sounds. It is used in conjunction with a telephone receiver. A very simple form of the instrument is shown in the figure. A and B are upright carbon rods, between which a carbon rod C is supported loosely. A and B are joined to terminals T, the whole resting on a sounding board D. The terminals are connected in series with a battery S and a tele-phone receiver R. When a vibration-as from the voice, or the ticking of a watch—alters the delicate balancing of C, the pressure at its ends is changed, and consequently the electrical resistance of the circuit is altered. This varies the current flowing round the circuit, and affects the telephone receiver, so that a sound is heard when it is held to the ear. The ordinary telephone transmitter is a microphone. See TELEPHONY.

Microscope, an optical instrument for producing magnified images of small near objects. Its simplest form is a single convex or converging lens, the essential optical properties of which are discussed under LENSES. To obtain strong magnification with a single lens, the lens must be bounded by highly-curved surfaces and have a very short principal focus, and the object must be placed between the focus and the lens. The rays from a point of the object will meet the greater part of the lens surface at considerable angles of incidence, and this will in general produce excessive aberration, both chromatic and spherical, with consequent colouring and distortion of the image. These serious imperfections are to a large extent obviated by using, not a single lens of very short focus, but a combination of two or three lenses of moderately short focal lengths - a so-called doublet or triplet. What the eye observes when the simple microscopic doublet is used is the image in the nearer lens of the image of the object formed in the lens farther from the eye. It is possible with these combinations, of which there are several varieties (Wollaston's, Wilson's, Fraunhofer's, Brücke's), to reach a linear magnification of 30, and Zeiss has constructed doublets with a magnifying power of 70. very high magnifications, how-ever, the simple microscope must give place to the compound microscope, which consists of two systems of lenses relatively far apart. The system near the object is called the objective; the other, and usually upper system, is called the ocular or the eyepiece. The principle, broadly stated, is that the objective forms a virtual inverted image of the object, and that the ocular forms a virtual erect image of this inverted real image. The closeness of the object to the objective causes the rays to enter the first lens of the system at large inclinations to the axis, and the difficulties of correcting for chromatic and spherical aberration are enormously increased. It was pointed out by Lister in 1830 that, by proper adjustment of their distance apart, the spherical aberration of two achromatic doublets could be neutralized. Partly by theoretical calculations, partly by careful experimenting, lenses of suitable refractive and dispersive powers are put together to form objectives as free as possible from the imperfections referred to. What slight imperfections remain may be corrected by suitable construction of the ocular. An objective of the kind known as homogeneous immersion was designed by Abbe and constructed by Zeiss, by means of which almost perfect images are obtained. Between the top of the glass cover which pro-tects the object and the plane surface of the hemispherical simple lens, which is the lowest member of the system, there is introduced a transparent oil of the same refractive index as the

glass. This enables the diverging system of rays to pass from the cover glass to the surface of the lens without any change in position, such as would occur if the intervening space were air. The result is to increase the effective aperture of the objective, so that more light enters the system. The effect of the hemispherical lens is to diminish divergence without introducing aberration. To this end there must be a particular relation connecting the distance of the object, the radius of the hemisphere, and the re-fractive index of the medium. The second hemispherical achromatic combination acts similarly to the rays falling on its plane surface. The various achromatic combinations are arranged and the distances adjusted so as to produce achromatism for three colours and destroy spherical aberration for two. In this way what is known as a clear achromaticaplanatic image is obtained. Abbe calls this form of objective an apochromat. By the use of such objectives the magnifying power of a microscope has been pushed very near to its theoretic limit, which may be set at about nine hundred diameters. It is usual to supply microscopes with several objectives giving different powers; and another range of powers may be obtained by the use of different oculars.

The eye-piece is generally made on the Huygens principle; but where it is necessary to introduce a micrometer scale, the Ramsden eye-picce is used. The best form of the Huygens eye-piece is a combination of two converging lenses, which have focal lengths as 3 to 1. and are separated by a distance equal to the difference of the focal lengths. The longer-focussed lens is farther from the eye, and is called the field-glass. The fieldglass receives the rays from the objective before they come to their focus. If it is desired to introduce a micrometer scale for the purposes of measurement, it must be placed between the fieldglass and eye-glass, and its image formed by the single strong lens would be greatly distorted. The Ramsden eye-piece is constructed of two lenses of equal focal length, placed about two-thirds of their focal length apart. This combination is not so good as the other for diminishing aberration; but since the rays from the objective come to a focus before falling on the field-glass, it is possible to introduce the micromcter scale at the position of the real image produced by the objective, and both scale and image are viewed by the eye-piece under the same conditions.

Microscope slides are usually illuminated by transmitted light,

and under these conditions it is possible that diffraction effects may be produced. To counter-act this Abbe has shown the necessity for having large apertures and strongly convergent beams of light illuminating the object under inspection.

years later the invention (by Father Della Torre or by Hooke) of the highly magnifying lens formed by melting glass and allowing it to take the spherical form under the action of surface tension, led to a crowd of discoveries; and about the same

LENSES IN EYLPIECE Fig OBJECTIVE OBJECT Fig 10 Fig 11

The Microscope.

Fig. 1. Ordinary form of microscope: a, body; a, stage (mechanical); c, coarse adjustment; n, fine adjustment; r, substage; containing condenser, iris diaphragm, stops, and colour screens; r, draw tabe; o, rackwork adjustment to draw tabe; a, rackwork focussing to substage; c, eyo-piece; t, introc; o, objective. Fig. 2. Dissecting microscope; Swift is stephenson bluocular. Fig. 3. Engineer's microscope: Reichert's, with vertical illuminator a for examinin; the surfaces of metals. Fig. 4. Path of the light through a modern achromatic compound microscope. Fig. 5. Diagram illustrating the comparative efficiency of dry and oil-inmersion lenses. Fig. 5. The special manual processing and the surfaces of the surface of the

The ancients knew, and probably made use of, the magnifying power of glass globules; but the manufacture of wrought glass lenses dates from the 14th century. Some three hundred

time the use of two glasses in combination produced the early forms of the compound microscope. Since then there has been a steady improvement in the art of manufacture of suitable lenses.

and in the theoretical discussion of the best modes of combination so as to get rid of the defects due to chromatic and spherical aberration. Euler was the first to indicate how to construct achromatic lenses (1759); but the method was not realized till early in the following century by several opticians, of whom Fraunhofer (1811) and Chevalier (1824) may be specially mentioned. Towards the middle of last century Ross effected many improvements in optical and in mechanical details. Within recent years the theoretical investigations of Abbe, and the mechanical skill of Zeiss, Schott, and others, have done much to en-hance the value of the microscope as a refined instrument of research. See works by Carpenter (1891), Wright (1895), Hogg (1898), and Heurck (1893).

Microscopium, a small southern constellation formed by Lacaille in 1752. It lies east of Sagittarius, and includes sixty-nine stars of 46 to 70 magnitude. One among them, θ_2 , is a revolving pair detected by Burnham in 1879.

Microstylis, a genus of tropical, terrestrial orchids with small, greenish-yellow flowers.



Freezing Microtome.

Microtome, an instrument designed to cut sections of animal or vegetable tissues for the purpose of histological examination. The three types in common use are (1) the Cambridge 'rocker,' which cuts a continuous 'ribbon' of sections, paraffin being used as the embedding material; (2) the Thoma sliding microtome, used for objects embedded in celloidin; and (3) the freezing microtome, used for objects which have been soaked in gum-water and then frozen.

Midas, a legendary king of Phrygia, who, having treated kindly Silenus, the attendant of Bacchus, was granted by the god power to turn everything that he touched into gold; but finding that even his food became gold, he begged the god to revoke his favour. Another story about him is that when Pan and Apollo once engaged in a contest on

the flute and lyre, Midas, chosen to judge between them, pro-nounced in favour of Pan. Thereupon Apollo changed his ears to those of an ass; he managed to hide them under his Phrygian cap until the secret was whispered abroad by a rustling reed.

Middelburg. (1.) Town, Netherlands, cap. of prov. Zee-land, near middle of isl. of Walnand, near middle of 181. of Watcheren, 4 m. by rail N. of Flushing. It has a 15th-century town hall. Pop. (1899) 18,837. (2.)
Capital of div. of same name, Transvaal, British S. Africa, 4 m. E. of Pretoria; in a coal district. Pop. (1904) 3,682.

Middle Ages, THE, a term

by the inability of the European rulers to hold their own against the invasions of the Northmen, was developed. By the end of the 10th century, however, feudalism had done its work, and mankind was ready to make a fresh advance. In this advance the papacy took the lead, and a religious impulse was given to the Christian world. The Hildebrandine revival penetrated into all countries in Europe, controlled the forces of feudalism, and brought about a loftier appreciation of man's duties and responsibilities. The crusades illustrated the influence of the Hildebrandine movement, and

in the papacy, and the wars of the 14th and 15th centuries, intensified these tendencies; the growth of commerce strengthened the middle classes, and, together with the use of gunpowder, dealt an overwhelming blow at the tottering fabric of feudalism. By the end of the 15th century, too, the growth of the renaissance had quickened and enlarged men's minds.

Middleboro, tn., Plymouth co., Massachusetts, U.S.A., 35 m. s. E. of Boston; is a summer resort. It has shoe and woollen factories, iron foundries, and marble works. Pop. (1900) 6,885. Middlesbrough, munic., parl.,

and co. bor. and seapt., N. Riding, Yorkshire, England, on the Tees, 34 m. E.N.E. of Stockton, and in the Clevelandiron district. Large iron and steel works, blast furnaces, foundries, rolling mills, tube works, and wire mills turn out weekly many thousand tons of pig iron, steel plates and ingots, plates for shipbuilding, rails, material for bridges, tuyère coils, telegraph and other wire. There are shipbuilding yards, engineering bridge and girder works, salt and chemical works, sawmills, and oil and concrete manufactures. Rock salt was discovered in 1882, and large quantities are prepared, chiefly from brine. Total exports (1905) £4,682,953; imports, £1,750,078. Amongst public edifices may be noted the municipal buildings, Dorman Memorial Museum, exchange, Cleveland Asylum, N.E. Railway station, etc. The town owns two public parks, the Albert Park and Victoria Square. The port has extensive docks; and two great breakwaters, one 4,400 ft. long, enclose a harbour of refuge. Middlesbrough has developed rapidly since 1850, when the rich iron deposits were opened up. The town returns one member to the House

returns one member to the House of Commons. Pop. (1901) co. bor. 91,302; parl. bor. 116,539.

Middlesex, the metropolitan county of England, and, except Rutland, the smallest in the country. North and north-west of London, and near Harrow, are hills rising to 400 ft., but the greater part is level or slightly undulating. It is drained entirely to the Theorem which forms the to the Thames, which forms the s. boundary. The New River, an artificial channel parallel with the Lea, supplies water to N. London. Market-gardening is carried on, and the acreage under small fruit is greater than in any other county except Kent. Large manufacturing establishments are the government powder mills at Hounslow and the small-arms factory at Enfield; steam-launches and torpedo boats are built at Chiswick; there are breweries, soap and chemical works, and ex-



Middlesex.

applied to the period from 476, when the Roman emperor, Romulus Augustulus, was deposed, to the year 1494, when Charles VIII. of France invaded Italy. beginning of the period thus co-incides with the arrival in Western Europe of the barbarian hordes. With the coronation of the Emperor Charles the Great (800) the theory of the Holy Roman empire sprang into being, and became the pivot round which all the ideas of the middle ages were grouped. According to that theory, the emperor and the Pope, as representing the temporal and spiritual authority of the world, held the supreme power. Feudalism, necessitated emphasized the notion of the solidarity of Europe under the empire and the papacy. But the success of the papacy led it to attempt to subjugate the civil power. Successive popes, from Hildebrand onwards, endeavoured to subordinate the civil to the ecclesiastical power. After a long and intermittent struggle between the empire and the papacy, the latter conquered. But the popes, unable to defend themselves against the Italian barons, fled to Avignon: the credit of the papacy was shaken. The feeling of nationality grew all over Europe; and England, France, and Spain developed national monarchies. The schism

tensive brick fields in and about Brentford. The Grand Junction and Paddington Canals furnish waterways. Exclusive of London, the county returns seven members to Parliament. Brentford is the county town. Area—anc. co., 283 sq. m.; admin. co., 232 sq. m. Pop. (1901)—anc. co., 3,585,139; admin. co., 792,225.

Middle Temple. See Inns of

COURT

Middleton. (1.) Munic. bor., Lancashire, England, 6 m. N.N.E. of Manchester. The district of Tonge is included in the town. The church of St. Leonards was erected in the 15th century, on the site of an earlier building, of

His best book is his Life of Cicero (1741), sympathetic in tone and dignified in style.

Middleton, John Henry (1846-96), English archaeologist, born at He abandoned architecture for literary and antiquarian pursuits. He was appointed Slade professor of fine arts at Cambridge (1886), keeper of the Fitzwilliam Museum there (1889-92), and (1892) director of the Art Museum at S. Kensington. Aman of vast and accurate learning, he made several valuable contributions to the 9th ed. of the Encyclopædia Britannica, and wrote an elaborate and very valuable work on Ancient Rome (new

Women (1657), The Mayor of Queenborough (1661), and The Witch (1778). Dekker helped him in The Roaring Girl (1611). In most of his plays Rowley had a hand, notably in his two master-pieces, A Fair Quarrel (1617) and The Changeling (1623). See Dyce's edition of his Works (1840) and Bullen's (1885 6); also Lamb's Specimens of English Dramatic Poets (ed. 1893), and Swinburne's essay in the Nineteenth Century (Jan. 1886).

Middletown. (1.) City, Orange co., New York, U.S.A., 55 m. N.W. of New York city. Pop. (1900) 14,522. (2.) City and episc. see, Middlesex co., Connecticut,



The Dent du Midi from Aigle.

which the tower arch (c. 1100) remains. Queen Elizabeth's grammar school was founded in 1572. The principal manufactures are those of cotton and silk. Pop. (1901) 25,178. (2.) Or MIDLETON, picturesque mrkt. tn., in E. of Co. Cork, Ireland, 7 m. N.E. of

Queenstown. It has whisky distilleries. Pop. (1901) 3,361.

Middleton, Conyers (1683-1750), English controversialist, was born at York or at Richmond, Yorkshire. He took an active part in religious controversy, the best known of his brilliant but bitter pamphlets being A Letter from Rome (1729) and An In-quiry into Miracles (1748). He anticipated the fundamental principles of historical criticism, and was a powerful agent in the intellectual development of the age.

ed. 1892), and left Plans and Drawings of Athenian Buildings

Middleton, Thomas (?1570-1627), English dramatist, was born probably in London. In 1620 he was appointed city chro-nologist, and wrote many triumphs and pageants. A political play, the Game at Chess, which satirized the Spanish ambassador Gondomar, brought him into trouble in 1624. Middleton was the author of two pamphlets— Father Hubburd's Tales (1603-4), and The Blacke Booke (1604) dealing with the seamy side of London life. Of his plays the best known are Blurt, Master-Constable (1602), A Trick to Catch the Old One (1608), The Spanish Gipsic (1623), A Chaste Maid in Cheapside (1630), Women Beware

U.S.A., on r. bk. of Connecticut, 14 m. s. of Hartford; is the seat of the Wesleyan University. It is a centre for cotton, rubber, and silk. Pop. (1900) 9,589. (3.) City, Butler co., Ohio, U.S.A., on Great Miami R., 30 m. N. of Cincipati has a manufacture. Cincinnati; has manufactures of paper, tobacco, bicycles, and agricultural implements. Pop. (1900) 9,215.

Middlewich, mrkt. tn., Cheshire, England, 21 m. E. of Chester; is noted for salt manufacture. It has also large chemical works and a condensed milk factory. Pop. (1901) 4,669.

Midges are flies belonging to the family Chironomide, and share with the Culicidæ, or mosquitoes, the title of gnat. midges are all small or even minute flies of slender form, fur-

nished with narrow wings, without the long proboscis of the mosquitoes, with long, slender legs, and usually with densely feathered antennæ in the male. There is much general resemblance between midges and mosquitoes, and certain of the former are as troublesome from their bloodsucking propensities as the mosquitoes. Atypical life-history is that of Chironomus. In this case the eggs are laid in stagnant water, in the form of strings surrounded by mucus. The larvæ, known as blood-worms, are aquatic, and have no tracheal system. After pupation the imagoes emerge, and form the characteristic swarms so commonly seen in damp localities in summer. blood-sucking forms mostly belong to the genus Ceratopogon, in which the larvæ are often terrestrial.

Midhat Pasha (1822-84). Turkish statesman, born at Constantinople; he rose to be grand vizier (1873). With the minister for war he deposed Abdul Aziz, and established a constitutional government, with Abdul Hamid at its head (1876). Aziz committed suicide, but (1881) Midhat was tried for complicity in his death, and was imprisoned at Taif in Arabia, where he died by vio-lence. See Life by Ali Haidar Midhat Bey (1903).

Midhurst, mrkt. tn. and par. Sussex, England, 10 m. N.E. of Chichester. Here are the ruins of an old castle, once the seat of the Bohuns; and the remains of Cowdray House, built by the Montagues, but destroyed by fire (1793). Here was begun in 1903 King Edward VII.'s sanatorium for consumptive patients of moderate means. Pop. (1901) 1,650.

Midi, CANAL DU, or CANAL DU LANGUEDOC, in S. France, connects the Mediterranean and the Garonne; length, 150 m.

GARONNE.

Midi, DENT DU, pinnacle-crowned ridge (10,696 ft.), 8. of Lake of Geneva, between the Swiss valleys of Champery (N.W.) and Salvan (s.E.). The ascent of the highest summit (first gained in 1784 by Clément, curé of Champery) is quite easy from the south.

Midianites, the descendants of Midian, one of Abraham's sons by Keturah. Their territory lay to the south of Moab and Edom. Joseph was sold to a company of Midianite merchants (Gen. 37); it was to Midian that Moses fled, and Jethro, priest of Midian, became his father-in-law (Exod. 2: 15, 21). According to Num. 22 f., the Midianites united with Moab against Israel, and were defeated; Gideon also conquered them (Judg. 6-8). See The Land of Midian Revisited (1879), by Sir R. Burton.

Midland Railway, of England, was established in 1844, being an amalgamation of the North Midland, Midland Counties, and Birmingham and Derby Rys., the system being extended from Bedford to London (St. Pancras) in 1868. The Belfast and Northern Counties Railway was acquired in 1903. In England the company owns 1,3921 m., and partly owns 6591 m., and in Ireland 2381 m., the main lines running from London (St. Pancras) to Carlisle, from Bath to Carlisle, and from Belfast to Londonderry. The authorized capital is £191,051,075. In 1905 the revenue of the English section was £11,751,918, and in 1904 of the Irish section £336,330, and the expenditure £7,237,239 and £212,148 respectively. The dividend for both years on the combined preferred and deferred ordinary stocks was 5 per cent. A large harbour at Heysham, Lan-cashire, has been constructed principally for cross-channel traffic between England and Ireland and the Isle of Man.

Midlothian See EDINBURGH-SHIRE

Midnapur, munic. tn. and cap. Midnapur dist., Bardwan, Bengal, India. It is 65 m. s.w. of Calcutta, with which it is connected by canal, and is the seat of several educational establishments, including an American missionary college. Its indus-tries include copper, brass, silk, and indigo. Pop. (1901) 33, 140. Midnight Sun is visible with-

in the Arctic circle at and near midsummer. The sun is then observed to skirt the horizon without dipping below it. This results from the inclination of the earth's axis to the ecliptic. the earth's axis to the eclipide. For the elevation of the pole at any given spot is equal to the latitude of that spot; and the sun's polar distance on midsummer day being 66½°, it follows that in latitude 66½° he can barely graze the horizon. Still farther north the midnight sun is observed for some days before and after midsummer; and at the pole itself a day of six months begins at the spring equinox, the sun circling at first round the rim of the horizon, then in gradually more elevated circles parallel to it. At the North Cape (lat. 731°) the midnight sun is visible from May 12 to July 29.

Midrash, the name given to the oldest expository material of Jewish scholars, gradually accumulated from the explanation or amplification of Scripture passages. It was of two kinds: the Halakhah-i.e. the spiritual way -treating of customs and ordinances; and the Haggadah, or narrative, comprising folklore and illustrations. While the former was held in high rever-

ence, the latter carried only the authority of the individual com-mentator. The Mishna contains what is extant of the Midrash.

Midriff. See DIAPHRAGM. Midshipman, a naval officer of warrant rank, who is being trained for a commission. A midshipman's duties include taking charge of boats, mustering the watch, heaving the log at sea, and at the same time proceeding with hi studies in mathematics, trigonometry, and French, under the naval instructor; in seamanship, gun-nery, and torpedo, under a lieutenant; and in steam, under the chief engineer. See NAVAL OFFICERS; CADETS, NAVAL; and NAVAL EDUCATION.

Midsummer Day, the 24th of June, being the summer solstice, and therefore one of the high seasons of sun-worship, has for ages been held in reverence in all the countries of Europe. solemnities began on the preceding night, the eve of St. John (for the day itself was in later times associated with St. John the Baptist), or Kupalo's Night, as it is called in Slavonic lands, in memory of the deity whose effigy still figures in the ceremonial. The three main features of the festival are bonfires, a torchlight procession round the fields, and the custom of rolling a blazing wheel downhill—this last being supposed to symbolize the sun, as in the kindred in-stance of the 'clavie' or 'dourie' at Burghead, Scotland. All three practices were believed to exercise a quickening and fertilizing influence on crops, animals, and even mankind; as witness the Irish custom of driving barren cattle through the flames, or that of women dancing round or across the fire to ensure progeny. Huge wicker-work giants, like those used by the Druids, figured prominently in the Midsummer pa-geants of London, in the 'Fol-lies of Dunkirk,' and in many other parts of Europe. See J. other parts of Europe. See J. G. Frazer's *Golden Bough* (2nd ed. 1900). Midsummer Day is one of the four English term-days.

Midwifery, the art or practice of assisting child-birth. It is taught to all medical students, under the term obstetrics. Until quite recently any woman who chose to do so could call herself a midwife; but since April 1. 1903, no woman in England and Wales may style herself a midwife unless she be certified under the Midwives Act of 1902. Since April 1, 1905, no one can be admitted as midwife without examination by the Central Midwives' Board. After 1910 no woman may practise for gain as an un-certified midwife at all, whether she use the title or not. County councils will exercise general

supervision over midwives within their districts. This power may be delegated by county councils to district councils; but the tend-ency is to reserve it, and to ap-point the county medical officer as chief supervisor. The rules drawn up for the guidance of midwives restrict them to the conducting of normal confine-ments only. Medical aid must be summoned for anything else, the midwife being held responsible. This act does not apply to Scotland and Ireland.

M.I.E.E., Member of the Institute of Electrical Engineers.

Mieres, mining tn., prov. Oviedo, Spain, 9 m. s.E. of Oviedo. Coal, iron, and cinna-bar are mined. Chemicals are manufactured. Pop. (1900) 18,083.

Migne, JACQUES PAUL (1800-75), French theologian, born at Saint-Flour: went to Paris (1833) Charles Quint (1854); Rivalité de François I. et de Charles Quint (1875). See Life, in French, by Petit (1889).

Mignonette (Reseda odorata), a very fragrant flowering plant. bearing yellowish-green flowerets in crowded racemes. It can be grown both in pots and in the open; thrives in towns. It likes a cool situation, and moist, moderately rich soil. Seed should be sown in April and May for summer flowering, and in July for autumn blooms. For winter and spring flowering in rooms or conservatories seeds should be sown in August and September, using the pots in which the plants are to flower. The pots should be placed in a cold frame till October, plenty of air being

Mignot, Louise. See Denis. LOUISE

proaching attack tend to affect the vision, the patient sometimes seeing dark spots or lines, sometimes bright ones; sometimes the field of vision is smaller than usual in circumference; in some rare cases definite objects, such as mice, appear to be present. Often only one eye is affected, and in that case it is generally the eye opposite to that side of the head which will presently ache. Some people complain of numbness in the side or the arm at the beginning of an attack. Later the headache comes on, and the irregularities of vision go, and with the headache many people suffer from intense nausea and vomiting, and during the attack are quite unable to take food of any kind. This condition may last from a few hours to about three days.

Treatment. Great care must



The Midnight Sun in Norway.

Photo by Valentine

and founded a paper, L'Univers Religieux. He then formed a printing establishment at Petit-Montrouge, which turned out En-cyclopédie Théologique (1844-66, in 171 vols.); Patrologie Cursus Compelius (Leisenier, 1944-66) Completus (Lat. series, 1844, etc., 221 vols.; Gk. series, 1856, etc., 58 vols.), and Collection des Ora-

58 vols.), and Collection ares Orateurs Sucres (1846-8, 100 vols.),
Mignet, François Auguste
Marie (1796-1884), French his
torian, born at Aix. Coming to
Paris, he published History of the French Revolution (1824; Eng. After being elected (1836) member of the French Academy, he published a series of masterly works, dealing chiefly with the 16th and 17th centuries, as Antonio Perez and Philip II. (Eng. trans. 1846); The Hist. of Mary Queen of Scots (Eng. trans. 1851);

Migraine, MEGRIM, or HEMI-CRANIA, a paroxysmal attack from which some suffer periodically, principally remarkable for violent headache, generally felt only in one side of the head, and apt to occur in members of the same family, or to trouble one of a family in which nervous diseases, such as hysteria or epilepsy, are found. Hence some authorities class it as a kind of 'explosion' of sensory nerves, and some say it is particularly associated with the sympathetic nervous system. Some again associate it more particularly with mistakes in diet, especially with overuse of nitrogenous foods, and weakness of the alimentary system. It attacks females more often than males, and is practically confined to people whose lives are sedentary.

The first symptoms of an ap-

he taken in diet. Exercise in the fresh air is also an obvious help. Both stimulants and sedatives are used. Caffeine or strong tea or coffee are thought useful by some, while others recommend bromides and other sedatives. A highly recommended cure, be-lieved to be often permanent, is the introduction of a seton in the neck. During an attack the sufferer is most at ease when lying perfectly quiet in a darkened room.

Migration of Animals. Large numbers of animals, alike among vertebrates and invertebrates, are remarkable for the periodic movements in which they engage. Speaking generally, these movements are determined by the supply of food or of water, or by the need of obtaining suitable breeding-places in which the young may be reared in security.

But this explanation does not explain fully the apparently mad intensity of the impulse to migrate in some cases; nor does it explain the apparent localization of the migratory instinct in certain races of a species, many of whose members may be non-migratory, nor its apparent spo-

Britain, a case of great complexity, which has been worked out by Mr. W. Eagle Clarke. Throughout most of Great Britain the skylark is chiefly a resident species, shifting its quarters from high ground to low, or from one locality to another in winter, as compelled by climatic condi-

the continent of Europe migrate to the south of Europe in winter, and are seen off the British coasts as birds of passage. Hence skylarks are far more numerous in Great Britain in late autumn than at any other time of the year. In early autumn, too, the birds which have bred in the more northerly parts of the British area begin to migrate to its more southerly regions, their place being taken by immigrants from Scandinavia. This shows that it cannot be the food supply alone which determines the movements, for if there is food enough for the immigrants, there must have been enough for the homebred birds. Not the least re-markable feature of the great autumn westward stream from the Continent is that these birds actually cross the track of Brit-ish-bred birds migrating east-wards towards the Continent to

As regards the migrations of mammals, that of the lemmings is discussed under LEMMING. A vast number of other mammals, however, indulge in more or less regular migrations, determined directly or indirectly by the changes of the seasons. Thus in the case of practically all mountain animals there is a regular and periodic alternation between the high ground in summer and the lower levels in winter. the reindeer, the kulans or wild asses of the Asiatic steppes, and indeed the majority of the large herbivorous mammals, alternate between one feeding-ground and another as the seasons make the one or other suitable. More extensive and more definite are the migrations of aquatic mammals, primarily determined by the necessity of finding safe breedingplaces.

winter in its southern parts.

Migrations of quite similar type occur among fish, where the periodic movements of salmon, ecl, herring, and other forms are familiar; while such reptiles as turtles also migrate to and from their breeding-places.

Among invertebrates the movements of the locust seem to be entirely determined by the foodsupply. Among Crustacea, again, we find migratory movements quite comparable to these of birds in the land-crabs of the genus Gecarcinus. These animals migrate annually to the sea in order to lay their eggs. In general, however, the migrations of invertebrates lack the regularity that is so noticeable in those of many ertebrates

those of many vertebrates. See Brehm's From North Pole to Equator (trans. 1896); British Association Reports (from 1883 to date); Gitke's Heligoland as an Ornithological Observatory (trans. 1895); Barrington's Migration of



The Mikado, or Emperor of Japan.

radic appearance among a previously stationary set of individuals. The phenomenon is most general and most prominent among birds, for practically all birds seem to be migratory to some extent. Some of the main features of bird-migration may be studied in the movements of the skylark (Alauda agrensis) in

tions, but not moving to any great distance. But as the winter climate of Britain is much milder than that of North and Central Europe, a considerable number of foreign skylarks winter in the warmer parts of the British area, returning again to their breeding area in spring. Again, a very large number of skylarks from

Birds as observed at Irish Lighthouses and Lightships (1890); and article 'Migration' in Newton's Dictionary of Birds (1893-96), For the relation of the migratory habit to problems of distribution, see Nicholson and Lydekker's Manual of Palwontology (1889).

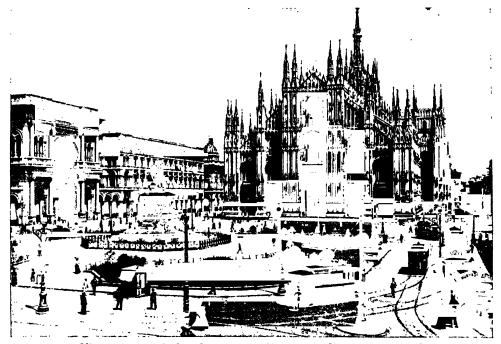
Miguel, MARIA EVARIST (1802-66), usurper of the throne of Portugal, son of King John VI., was born at Lisbon. He refused to recognize the constitution of 1822. heading an unsuccessful insurrection. His brother, Pedro IV. of Brazil, on his accession to the Portuguese throne, betrothed his daughter Maria to Miguel, and abdicated in her favour (1826),

Compositæ. The best species is M. scandens, which bears yellowish flowers in summer.

Mikhailov, tn., Ryazan govt., Central Russia, 40 m. s.w. of Ryazan city. It manufactures candles, and has tanneries. Pop. (1897) 9,149.

Miklosich, FRANZ VON (1813-91), Slavonic scholar, born at Luttenberg, Styria, was professor of Slavonic in the University of Vienna from 1850 to 1885. Amongst his valuable works are Vergleichende Grammatik der slawischen Sprachen (4 vols. 1852-74), Lexikon Lingue Palceoslovenico-Graco Latinum (1862-65), Albanische Forschungen (1871), and

who was crowned King of Italy in 1805 with the iron crown of Lombardy. This is preserved in the Church Sant' Ambrogio, built in the 4th century. The town is exceptionally rich in monuments and in public gardens. are numerous museums, picture galleries, and educational institu-tions. Among its theatres the famous Teatro della Scala is of world-wide renown; the printing of music is an important industry; others are silk reeling and weaving, and the manufacture of velvet, machinery, chemicals, and metal work. Milan is the centre of the Italian book trade. There is a home for artists, founded by



Milan: the Cathedral, and Square with Monument to Victor Emmanuel II.

Miguel acting as regent. In 1828, supported by the nobility and clergy, he proclaimed himself king, but after six years of bloodshed and civil war was dethroned and banished (1834).

Mikado, sovereign of Japan. The Japanese no longer use this word, but prefer the Chinese designations Tenshi ('Son of Heaven') or Tenno, for which 'Emperor' is the recognized English equivalent. The present Mikado, Mutsuhito, was born in 1852, and succeeded to the throne in 1867.

Mikania, a genus of tropical American evergreen climbing plants belonging to the order

Etymologisches Wörterbuch der slawischen Sprachen (1886).

Miknas. See Mekinez.
Milan (Ital. Milano). (1.)
Province, N. Italy. Area, 1,221
sq. m. The country is mostly
a fertile plain. It is bordered
by the rivers Po, Ticino, and
Adda, which are connected by a
network of capale. The principal network of canals. The principal articles of commerce are corn, rice, flax, cattle, butter, cheese, silk, fruit, and wine. Pop. (1901) 1,442,179. (2.) City, cap. of above, 165 m. by rail w. of Venice. The centre of the city is occupied by the famous cathedral, built of white marble, commenced in 1386 and completed under Napoleon I.,

The Insubrians, having destroyed the Etruscan town of Melpum (396 B.C.), built in its place, as capital of Cisalpine Gaul, the city of Mediolanum. It was taken by Scipio (222 B.C.), and under Roman rule became a seat of learning. In 303 A.D. the Emperor Maximian I. chose it as his residence, and made it the capital of Northern Italy, which it remained for about a century. It was ravaged by At-tila the Hun in 452, and in 476 the Gothic king Odoacer made it his residence. After being held for a time by Belisarius, it was recaptured by the Goths in 539, when some 300,000 inhabitants

perished by the sword. Otto I. was crowned emperor at Milan in 961. After numerous wars with the German emperors and much internal strife, Milan became a duchy in 1395 under Gian Galeazzo Visconti. Having been held by Spain (1545) and Austria (1714), it was occupied by Napoleon Bonaparte in 1796, who made it the capital of the kingdom of Italy in 1805. Ten years later it reverted to Austria. It was the scene of great disturbance during the troubles of 1848-9 and 1853, After the peace of Villafranca (1859), it was ceded to Piedmont. Pop. (1901) 490,084.

Milan I. (1854-1901), king of Servia, born at Jassy in Roumania. On the assassination of his uncle, Prince Michael Obrenovitch (1868), he succeeded to the throne under a regency, and in 1872 was declared of age and assumed government. He declared war against Turkey (1876), and obtained the independence of Servia, being proclaimed king (1882). In 1889 he abdicated in favour of his son Alexander, and retired to Paris. He returned (1894), when his son was in political difficulties, and acted for a time as commander-in-chief of the army. He died at Vienna.

Milanion. See Atalanta.

Milá y Fontanals, Manuel (1818-84), Spanish scholar and poet, born at Villafranca del Panades. He was professor of poetry at the University of Barcelona, was associated with Balaguer in the Provençal poetic revival, and was author of Los Trovadores en España (1861), Romancerillo Catalan (new ed. 1882), Principios de Literatura General (new ed. 1888), and many charming pathetic ballads in the Catalan tongue. See Vida y Escritos, by Jonquin Rubio y Ors (1887), and his Obras Completas, edited by Menendez y Pelayo (1888-98).

Milazzo, or Melazzo, seapt.
tn., prov. Messina, Sicily, on a
peninsula 16 m. w. of Messina.
Its harbour is used as a place of
refuge, vessels drawing 20 ft. of
water being able to enter. Among
its principal products are wine,
cattle, fruit, and sulphur. It
exports tunny-fish and olive oil.
Its ancient name was Mylæ, and
it was the scene of a naval victory
by the Romans over the Carthaginians in 260 B.C.. Here Garibaldi defeated the Neapolitans
in July '860. Pop. (1901) 16,214.

Mildew, a name used to include attack various animal and vegetable products, and even living flowering plants. They are mostly species of Oidium. The best remedy is a dusting of finely powdered sulphur. Another excellent remedy consists in syringing the

plants with a mixture made by boiling a pound each of flowers of sulphur and quicklime in five pints of water for ten minutes, and then diluting the clear liquid one hundred times. The best means to prevent an attack of mildew is free ventilation and keeping the plants healthy and vigorous.

plants healthy and vigorous.

Mildmay, SIR WALTER (1520S9), chancellor of the Exchequer
and founder (1584) of Emmanuel
College, Cambridge, was born at
Chelmsford. He entered Parliament (1553), and became chancellor and under-treasurer of the
Exchequer (1566), which office he
held till his death.

Mile, a measure of distance first used by the Romans, whose mile was 1,617 English yards. The modern mile varies in different countries. The English statute mile (legalized 1593) is 1,760 yards. The geographical mile (nautical mile or Admiralty knot) is one minute of the equator, 2,0263 yards, and is used by all sailors.

Miles, NELSON APPLETON (1839), American soldier, born at Westminster, Massachusetts. He served on the Federal side in the civil war, being present at Antietam, Chancellorsville, and Spottsylvania. He conducted several Indian campaigns (1875-91), was commander-in-chief (1895-1903), and commanded the army during the Spanish-American war (1898). He published Personal Recollections (1897).

Milesians, natives of Ireland, the word being derived from Milesius, a legendary king of Spain, whose sons are said to have conquered Ireland. The term is synonymous with Scots.

Miletus, ancient city of Asia Minor, in Caria, on Gulf of Latmos. About 1000 B.C. it was colonized by Ionians, and soon attained to great prosperity. chief trade was in woollen fabrics. It founded many colonies, principally on the Black Sea Sinope and Trapezus. Having been conquered by the Persians. it headed the great revolt against them which was suppressed in 494 B.C. It belonged successively to the Athenian League, the kingdom of Pergamus, and the Roman empire. A place of great importance in Greek literature, Miletus was the birthplace of Thales, Anaximander, Anaximenes, Cadmus, and Hecatæus. It is now a squalid Turkish village (Palatia). Excavations were begun in 1899. See Miletus, by Haussoullier (1902).

Milfoil. See ACHILLEA.
Milford. (1.) Seaport town,
Pembrokeshire, Wales, on the N.
shore of Milford Haven, 70 miles
by rail w. of Swansea; originally
planned by Sir William Hamilton
(1790) for government docks and
Irish packet station. In 1814 the
docks were removed to Pembroke

dock, on the southern shore. Engineering, shipbuilding, and fishing are the chief industries. Pop. (1901) 5,102. (2.) M. HAVEN, land-locked arm of the sea, Pembrokeshire, S. Wales, extending inland for 17 m.; the finest, safest, and most completely sheltcred har-bour in Britain. Its width varies from 1 to 2 m.; its depth is from 15 to 19 fathoms. Henry II. set sail from Milford Haven for the conquest of Ireland: Glendower's French allies landed on its shores, as did Henry VII. before the battle of Bosworth Field. (3.) M. SOUND, the grandest of the fiords on s.w. coast of South Island of New Zealand, 10 m. long by 1 m. broad. On the s., Mitre Peak rises sheer from the water 5,560 ft. On the N., the Darran range culminates in Tutoko (9.042) ft.). Of numerous waterfalls, the finest is the Bowen Fall (530 ft.); 141 m. from the head of the sound are the Sutherland Falls, descending by three leaps 1,904 ft. (4.) Town, Worcester co., Massa-chusetts, U.S.A., on riv. Charles, 18 m. s.e. of Worcester. Boats are built, and boots, shoes, silk, and machinery manufactured. There are granite quarries. Pop. (1900) 11,376.

Military Education. Officers on joining the army go through a course of instruction in drill, musketry, regulations, etc., either at the depôt or with their regiment or hattery, before becoming available for duty. Officers of the engineers have, in addition, to undergo a further course in technical subjects lasting nearly two years. See Promotion.

Infantry.-The recruit is trained (in drill chiefly) at the brigade depôt for at least two and a half months. On joining his battalion his company officer takes charge of his training, and the recruit also attends school. He first passes through twelve weeks' training in gymnastics, marching, drill, sentry duties, fitting on accoutrements, etc.; then musketry; and after twenty-seven days' target practice, he becomes a trained soldier.' Each company goes through an annual field-training in tactics-reconnoitring, outposts, field fortification, bridging, bivouacking, etc .lasting for twenty working days. Annual target practice lasts for fifteen days. In the winter, route marching is practised in combination with small tactical operations, usually three times a week. Each regiment usually takes part in annual manœuvres at the camps of exercise.

Cavatry.—The recruit is trained with his regiment, or, if the latter is abroad, with another corps. A two months' course in foot drill, gymnastics, stable work, and fencing; then two months at rid-

ing, sword drill, saddlery, etc. After a musketry course, the recruit becomes a trained soldier. Squadrons go through annual musketry and refreshing courses. The annual training consists of riding across country, dismounted fighting, bivouacs, outposts, fencing, patrol dutios, reconnoitring, map reading and drawing, squadron drill, and general service in the field. Each regiment joins, if possible, in the annual manceuvres at the camp of exercise.

Horse and Field Artillery.—
Recruits' course:—Eight weeks at the depôt—foot drill, and gymanatic with the hotters.

Horse and Field Artillery.—
Recruits' course:—Eight wooks at
the depôt--foot drill, and gymnastics; with the buttery—gun
drill, handling ammunition, loading guns on railway trucks, stable
work, riding, driving, and a short
target practice with carbings

target practice with carbines.

Trained Soldiers' Course.—An-

spend three months at the depôts in drill, target practice, riding, driving, and stable work. Trained soldiers go through annual target practice.

Various schools and colleges are established for training officers and men of all branches in special subjects. There are also the Army Veterinary School for the training of officers of the regular army, veterinary surgeons, farriers, etc.; School of Cookery for training sergeant-cooks; Kneller Hall for instructing musicians; school for instructing the permanent staffs of yeomanry and volunteer cavalry, etc.

A General Staff is in process of formation (1905), which will be responsible for the training of the whole British army, as suggested by the Esher Commission. consists of a commandant, assistant-commandant, brigade-major and secretary, five instructors, six assistant-instructors, and a quartermaster.

Military Lands Act, 1892, enables the Secretary of State for War to purchase land in the United Kingdom for any military purpose. It enables volunteer corps and county and borough councils to purchase and hold land for military purposes. On disbandment of a volunteer corps their land vests in the Secretary of State, subject to repayment of borrowed purchase-money. Public bodies are also empowered to lease land to a secretary of state or a volunteer corps for military purposes for any term not exceed

ing twenty-one years. The act was amended in 1897 and in 1900,



Bartholomer. Edm

nual training of fourteen days in tactics, field service, bivouacs, etc. Refreshing courses in all subjects during the winter. Annual target practice with guns at Okehampton, etc., during the summer. (See CAMP.) The garrison artillery do not learn riding, etc., and do their target practice with big guns at their stations or at Lydd.

Engineers. — Recruits are instructed in drill, musketry, and field operations as for the infantry, and trained in their trades at the depôts; also in camp duties, field fortification, bridging, etc.; mounted branches in riding, driving, and stable work. Field training and target practices held annually.

Army Service Corps.-Rocruits

Military Engineering, School OF, is the centre of instruction in engineering for the army, and is to be removed from Chatham to Cooper's Hill near Egham in 1906. There all engineer officers and men are put through courses of instruction, which include military duties and musketry, but turn chiefly on purely engineering subjects and branches of knowledge connected therewith, such as fortification, surveying, science, astronomy, and photography. Special courses are held in telegraphy, submarine mining, drawing, and printing. Elementary courses in field-engineering are also held periodically for officers and men of the cavalry and infantry. The staff

when provisions were added for compensation for injury to private rights.

Military Law. As soon as a soldier is enlisted or an officer has been gazetted to his commission, he passes under military law as laid down in the Army Act, and has no appeal to civil law. Leave to take part in any civil action, or to prosecute in a criminal case, has to be obtained from the general officer commanding the station. Neither an officer nor a soldier can demand a court-martial as a right, and, theoretically at least, a soldier has no appeal beyond his commanding officer.

Military Mounted Police, a small body of specially selected

men from the non-commissioned ranks of the cavalry, charged with the duty of patrolling wide areas of country. It is liable to be called upon to assist the civil police in case of emergency, and can, in its turn, demand assistance from the constabulary. It is divided into four divisions, stationed at Aldershot, Salisbury Plain, the Curragh, and Cairo respectively.

Military Operations and Military Training, DIRECTORS OF. These are two positions created by the War Office Reorganization Scheme suggested by Lord Esher and his colleagues in 1904. They are the chief assistants of the chief of the general staff, and their duties are sufficiently indicated by their titles. Each appointment is for four years, and is held by a majorgeneral.

Military Orders. See Hos-PITALLERS, TEMPLARS, ORDERS.

Military Prisons are under the control of an inspector. Central and district military prisons are appointed for the punishment of soldiers convicted of breaches of discipline (and not intended to be discharged with ignominy), who have been sentenced to imprisonment exceeding fourteen days. Soldiers awarded imprisonment for lesser periods are confined in a branch military prison or in the barrack cells. Military prisoners convicted of disgraceful or felonious offences, or who are sentenced to be discharged with ignominy, are committed to a civil prison.

Military Schools. See ARMY MEDICAL COLLEGE, ARMY

SCHOOLS.

Militello, tn., prov. Catania, Sicily, 23 m. s.w. of Catania; has trade in fruit, wine, and silk.

Pop. (1901) 11,503.

Militia. Before the Norman conquest the general levy of freemen at the king's summons was known as the fyrd, and fyrd-fare was one of the three liabilities of the landowner. The levy of ablebodied men in each county might be made for a civil purpose, such as to suppress a riot, or for a military object, such as the defence of the realm in time of invasion. The general levy for services outside the realm was replaced under the Norman kings by the feudal levy. At the restoration in 1660, the formation of a standing army led to the abolition of the feudal levy; but the organization of the general levy in trained bands in each county still remained. The command of these trained bands, the disposal of their arms, and the appointment of their leaders were settled by statute in 1662, and the name of militia first applied to them.

In its original constitution, the militia —a body of soldiers for home defence—was quite distinct from and independent of the regular army. The men were paid out of the county rate, were dif-ferently equipped and clothed, and for disciplinary purposes were dealt with by the civil magistrature. Owners of property had to furnish horses, men, and arms according to the value of their possessions, and the liability of the poorer population was discharged by a rate levied on the parish, Lieutenants of counties were empowered to commission the officers, raise the number of men required, and muster and exercise the troops for a limited period in each year. The militia was looked upon as a counterpoise to the regular army, being a constitutional force, under the control of Parliament. The force thus created was called out in 1690 on the occasion of an anticipated French invasion, and subsequently during the re-bellions of 1715 and 1745. A series of radical changes were effected in 1757. The quota of effected in 1757. The quota of men to be raised in each county was fixed by Parliament, and the burden of furnishing the men and their equipment was laid on the county and parish, instead of on the individual landowner. The term of service was fixed at three years, and the militiamen were enrolled by ballot, with liberty to secure substitutes. Parishes were allowed to provide volunteers by payment or otherwise. The pay, clothing, and expenses of training were for the first time defrayed from the national exchequer. The militia, when embodied, were to be placed under the command of an officer of the regular forces, and made subject to military law. Between 1757 and 1815 the term of service was increased to five years. From 1815 to 1852 the militia was allowed practically to fall into abeyance. As a result of the Crimean war, the force was brought more directly under the control of the crown, and the ballot was replaced by a system of voluntary enlistment for a period of six years, while measures were taken to train the force in conjunction with regular troops. The occasions on which militia can be embodied have been extended in scope, and the county battalions have been attached permanently to the regular regiments, with a similar territorial designation. The tendency of modern legislation is towards the gradual absorption of the militia into the regular forces, and to making the constitutional force at once a feeder for supplying recruits in time of peace and a reserve in time of war. The militia, commonly so called, is the general or regular militia, as distinguished from the local militia, which was established at the beginning of the 19th century, and which, though in abeyance, might still legally be raised. The men can be raised by ballot in each county, and must serve for four years, without any power to find a substitute, and without receiving any bounty. With few exceptions, there are no exemptions from liability to serve; but parishes may provide volunteers and pay them bounties out of the rates. The counties are liable to an annual fine of £15 for each man short of the quota demanded by Parliament. In case of a hostile invasion the sovereign has the right to call out the trained men, to add them either to the regular army or the general militia, or to form them into separate corps. The local militia, whenever called out, is subject to military law.

See also ARMY, BRITISH.

MILITIA ACTS .- The Militia Act of 1882 authorizes the raising of a militia force by voluntary enlistment, and states that the engagement shall be for six years, with power to re-engage for a further term of six years. No part of the force is to be called upon to serve out of the United Kingdom unless a voluntary offer to serve abroad is made by its commanding officer. Provision is made for annual training and embodiment. Offences of militiamen can, as a rule, be charged under the sections of the Army Act as well as those of the Militia Act, and can also be dealt with by civil courts of summary jurisdiction. acts establishing a local militia in England and Scotland were those of 1808. This force was to be raised by ballot from among men between the ages of eighteen and thirty. Service was for four years, and substitutes were not allowed. Men serving in a volunteer corps and providing their own uniform and arms were exempt, and parishes were authorized to provide volunteers and pay them bounties out of the rates. The Acts of 1808 were amended and finally consolidated in 1812, and have never been re-The local militia numpealed. bered 200,000 in 1809, and the force was called out for annual training until the peace of 1815. The Militia Reserve Act (now embodied in the Reserve Forces Act, 1882) created a new departure. It enabled the crown to make an engagement with a proportion of militiamen in every corps to serve as regular soldiers in the army in case of emergency. The value of the men to the army was undoubted, but there was the sericus defect that in time of emergency the militia battalions were depleted of their best men. The old militia reserve is now abolished, and a new reserve of 50,000 men stands in the same relation to the militia force as the army reserve does to the regular army.

Milk, the secretion of the mammary gland of the female mammal, is a typical and model food, containing all the nutritive compounds required by a growing animal, and containing them in the correct proportions of a scientific dietary. It does not, however, fulfil these conditions when considered as a food for an adult. Various theories have been advanced as to the secretion of milk, but the question cannot yet be said to be finally settled. In all probability it is mainly produced by the breaking down of the epithelial cells of the udder; and to the products so formed constituents from the blood are added, for the fat of milk is undoubtedly formed partly from the blood. The milk of all animals is made up of the same ingredients, but they differ considerably in percentage com-position. The following table shows the composition of the milk of various animals, according to analyses by König: -

	Water.	Casein.	Al- bu min,	\sh	Milk Sugar.	Fat.
Human Cow Ewe Goat Mare	87:41 87:17 80:82 85:71 90:78	1.03 3.02 4.97 3.20 1.24	1.26 0.53 1.55 1.09 0.07	0.31 0.71 0.89 0.76 0.35	6:21 5:88 4:91 4:46 5:67	3.78 3.69 6.86 4.78 1.21
Ass	89.61	0.67	1.22	0.21	5.99	1.64

The figures must be taken as representing the average composition of the milk of each animal, for the milk of the same animal varies within very wide limits. Thus, in the case of cow's milk the quality depends on the breed of the cow, on the time of year, on the feeding, on the intervals between milkings, and on a number of other circumstances. With the mixed milk of a large herd of cows the composition is fairly constant, as the poor milk of one cow is balanced by the extra rich milk of another; but with individual cows the variations are very marked: for example, the lowest percentage of fat that has been recorded is 0.25, while the highest is over 110. In an analysis of milk the casein, albumin, milk sugar, and ash are classed together as 'solids not fat,' and these have been observed to range from 5.5 to over 12.0, though they rarely fall below 85 or exceed 110. Under the last Food and Drugs Act, the Board of Agriculture have the power to fix a standard for milk. and they have decided to adopt 3 per cent. as the limit for the fat, and 81 as the limit for the solids not fat,' as indicating genuine milk, unless the contrary is proved. The fat of milk is in the form of globules differing in size, and numbering two or three millions to the cubic millimetre, which, when the milk is allowed to stand, rise to the surface along with a portion of the casein, and form a mixture known as cream. The separation is never complete, but under the most favourable conditions the residual milk contains under 1 per cent. of fat: this constitutes 'skim milk.' The opacity of milk is partly due to the suspended fat, and partly to the casein, which is in a semi-soluble condition.

In the above table of analyses the nitrogenous constituents of milk are only shown as casein and albumin, but, as a matter of fact, there are other nitrogenous matters present, though only in small quantities. Amongst these are peptones and colouring matter. The chief ingredients of the ash are potassium, calcium, and phosphoric acid. The chemical composition of milk renders it a very suitable soil for the cultiva-tion of bacteria. The souring of milk which occurs on standing is due to the presence of bacteria, through which lactic acid is formed, and the casein is precipitated in the solid form. word caseinogen has been suggested for the caseous substance as it exists in the milk, while the word casein is used for the solid casein separated from the milk either by souring or by other methods. Curd may be separated from milk either by the addition of an acid or by the action of rennet. Rennet curd centains a considerable proportion of the phosphates of the ash of milk, it is firm and elastic, contains very little fatty matter, and is slightly acid; while acid curd is a gummy, non-clastic mass, almost free from phosphates, strongly acid, and containing a considerable amount of fat. Milk is capable of undergoing alcoholic fermentation, and then forms a beverage known as 'koumiss;' the original koumiss was made from mare's milk.

Milk is also a suitable vehicle for the growth and transmission of pathogenic bacteria. Various methods have been devised to overcome the dangers of an impure milk supply. Pasteurization and sterilization have found most favour; and although these terms are often used synonymously, they really mean very different modes of treatment. In Pasteurizing milk it is heated to a temperature of at least 147° F., and sometimes as high as 184°, but never higher; it is kept at this temperature for about twenty minutes, and then rapidly cooled. By this treatment all dangerous micro-organisms are

destroyed, along with fermentation bacteria, though spores are not affected. The Pasteurized milk, when hot, has a slight cooked flavour, but this disappears when the milk is cooled. In sterilizing, on the other hand, the milk is heated to a temperature of 212° F., and maintained at that temperature for some time; it is then cooled. If required to be kept longer than a month, the process must be repeated. sterilized milk, if exposed to the air, will again take up germs, it is necessary to keep it, both during the process and afterwards, in closed vessels. Sterilized milk is a different article from fresh milk-its chemical composition is altered: the fat globules are no longer in the fine state of division, but have coalesced more or less into the buttery condition; while the milk is of a darker colour and possesses a peculiar cooked trste. Milk can also be preserved by the addition of certain chemical substances, such as borax, boracic acid, formalin, and sodium bicarbonate. Boracic acid and formalin are very largely used, especially for the purpose of preserving the thick cream which is sold in jugs

'Condensed milk' is milk from which most of the water has been removed by evaporation at a comparatively low temperature. first to suggest this method of preserving milk was a French-man named De Leinac, who in 1850 succeeded in producing condensed milk by evaporating in an open pan; but the plan now generally adopted is to evaporate the milk, either with or without the addition of sugar, in a closed pan under reduced pressure. The thick syrupy mass is then run into tins and at once sealed. If properly prepared from whole milk, it forms on dilution a good substitute for the

fresh article.

Milk Fever, a popular term for the slight rise of temperature which frequently comes on about the third day after childbirth, coincidently with a full secretion of milk. It quickly subsides when the child draws off the

Milk fever in cows is a disease that farmers and dairymen especially dread. It is the best animals that are the most liable to be attacked. The disease consists essentially in congestion of the brain and higher nervous centres, and quickly leads to stuper, followed by speedy death. The best preventive measures are to reduce the animal's condition where required by diminishing the amount and richness of food supplied for a week or so, and by giving hergentle exercise for some days before calving.

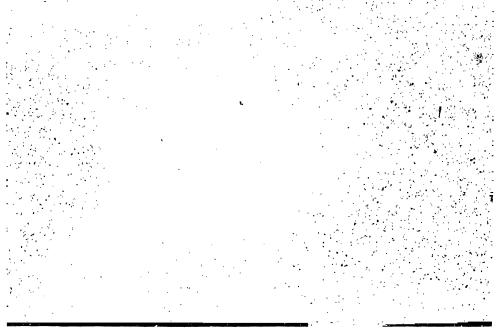
Milk Sugar, or Lactose, $C_{12}H_{22}O_{11}H_{20}$, occurs in milk, from which, after removal of the fat and casein, it is obtained by evaporation. It forms somewhat sweet, gritty crystals (sp. gr. 153), which are not very soluble in water. Constitutionally it is an octohydric alcohol-aldehyde that is stereoisomeric with maltose, and has a similar reducing action, but rotates the plane of polarization to a less degree to the right. It is used in pharmacy.

Milkwort, a name given to plants belonging to the genus Polygala, a subdivision of the order Polygalacee. The common milkwort (P. vulgaris) occurs

and vacuities abound, especially noticeable being the Coal-sack in Crux, measuring 8° by 5°, and a less conspicuous dark opening in Cygnus. The Milky Way is everywhere vaguely terminated, is of irregular breadth, and has numerous offsets and appendages. It is interrupted by a wide gap in Argo, where it forms a fan-shaped expansion 20° across. Its light, which shows a uniform texture in Monoceros, is in other sections flocculent or streaky. Since Galileo's time the Milky Way has been known to be composed of stars. Those producing by their aggregation the observed cloudy effect are indefinitely re-

270

the condensation is much greater for gaseous and helium stars, while temporary stars, with few exceptions, blaze out near its medial line. A spiral conformation was attributed to the Milky Way by Proctor. Celoria (Milan, 1878) explained it as a double annulus, and Easton as a system of spirals (Astrophysical Journal, xii. 136; Knowledge, xxi. 57). The enormous distance of its lucid aggregations was set forth by Newcomb in 1900 (The Stars, p. 317); and the subject has been studied, among others, by Sceliger (Denkschriften, Munich, 1894–98), Plassmann (Himmelskunde, 1898), Stratonoff (Tashkent Pub-



Telescopic View of part of the Milky Way.

frequently on heaths and dry meadow-land throughout Britain. It has simple stems and narrow leaves, and bears in late summer pinkish flowers, the lower petal of which is keeled or crested in a curiously stellate manner. The root yields a bitter milky juice.

Milky Way, a dimly luminous zone encompassing the heavens as a great circle, which intersects the celestial equator at an angle of 63°, and has its northern pole in R.A. 12 h. 47 m., D. + 27°. It bifurcates in Cygnus, and the two galactic streams run side by side over an arc of 120°, reuniting near the Southern Cross. Minor rifts

mote, and of uncertain real magnitude. The entire vast annulus is, however, of fundamental importance in the construction of the heavens, constituting, in Sir John Herschel's words, 'the ground-plane of the sidereal system.' But its influence over the distribution of the stars varies markedly for the different spectral classes. Professor Pickering has shown (Harvard Annals, xlviii. 183) that stars to the twelfth magnitude are twice as numerous within the galactic area (estimated to cover one-third of the sky) as outside it. The crowding, however, is mainly of Sirian objects (Ibid. lvi. 17); moreover,

lications, ii. 1900), and Adalbert Prey (Denkschriften, Vienna, vol. lxiii.). Delineations of the Milky Way, in its northern and southern sections respectively, were published by Heis in 1852, and by Gould in 1879; Dr. Boeddicker's beautiful drawings were completed at Parsonstown, Ireland, in 1889; Easton's charts somewhat later (La Voic Lactée, 1893), and his 'isophotal' map in 1903 (Trans. Amsterdam Academy of Sciences, partviii.). The photography of galactic structures has been prosecuted since 1889, chiefly by Professor Barnard, also by Dr. Max Wolf and Mr. H. C. Russell.

Mill, Hugh Robert (1861), Scottish chemist and geographer, was born at Thurso; was appointed chemist and physicist to the Scottish marine station at Granton in 1884; in 1887 he became a university extension lecturer; was librarian to the Royal Geographical Society (1892-1900); and then became director of the British Rainfall Association. He is the author of several geographical works—e.g. The Readm of Nature (1892), The English Lakes (1895), New Lands (1900), and The Suge of the South Pole (1905)—and is editor of the International Geography (3rd ed. 1903).



1, Stamens; 2, flower section.

Mill, JAMES (1773-1836), Secttish philosopher, was born at Northwater Bridge in Forfarshire. He proceeded to London (1802), where he lived by his pen. In 1806 he settled down to write a History of India, which occupied him over ten years. He got an appointment in 1819 to the India House as assistant examiner, and in 1830 was appointed head of the India House. After his re-moval to London he became a disciple of Jeremy Bentham, with whom he formed an intimate friendship. He gathered round him a number of able young men, such as Grote, Ricardo, and his own son, John Stuart Mill, who were known by the name of Philosophic Liberals. James Mill was a man of great originality of thought and strenuous character, holding tenaciously by extreme religious and political opinions, and exercising a great influence on the public life of his time. His essay on Government (1824) was

the text-book of the Benthamite school, and gave great impetus to the cause of reform. In 1821 he published his Elements of Political Economy. In 1835 appeared his Fragment on Mackintosh, a somewhat bitter attack on a great thinker. Six years previously, in 1829, appeared his Analysis of the Phenomena of the Human Mind, in which he endeavours to show that utility is the motive power of mental as well as of social progress. The contents of the mind, according to James Mill, were woven out of experiences of pleasure and pain by means of association of ideas. Liberalism was to him something more than the name of a political creed; it was a coherent theory of human life, of which political activity in a Liberal di-rection was the logical outcome. In his philosophic outlook, in his political creed, in his reliance upon reason, and in his contempt of sentiment, James Mill was essentially a product of the 18th century. See Life by Bain (1882).

Mill, John (1645-1707), English New Testament critic, born at Hardendale, Westmorland; became chaplain to the bishop of Exeter (1676), chaplain in ordinary to Charles II. (1681), principal of St. Ednund Hall, Oxford (1685), and prebendary of Canterbury (1704). His great work, occupying thirty years, and marking the beginning of modern Biblical criticism, was a new edition (1707) of the Greek Testunent, comparing and noting the variations in the different versions.

Mill, JOHN STUART (1806-73), English philosopher, was born in London, the eldest son of James Mill, who with deliberate design set to work to manufacture his son at a very early age into a philosopher after the approved Bentham type. At fourteen he had acquired Greek and Latin, had grappled with mathematics. and had made acquaintance with and had made acquaintelligit and political economy. In passed straight from childhood to manhood. On a visit to France in 1820 he made the acquaintance of Say, the political economist. The visit gave Mill an abiding interest in French liberalism, and in continental politics generally. In 1823 he entered the India Office under his father. He ultimately became the head of his department, and retired in 1858, when the government of India was transferred from the East India Company to the crown. In 1824 the Westminster Review was projected, as a set-off to the Edinburgh Review; and to the new review Mill contributed numerous articles. In 1830 he made the acquaintance of Mrs.

John Taylor, who exercised a marked influence over some of his opinions -an intimacy which ripened into marriage in 1851, Mill devoted his leisure to writing his Autobiography, which appeared after his death (1873). It was Locke, Helvetius, and Hartley who gave the mind of John Mill the philosophic bent which it retained till the end. Bentham's theories harmonized with a philosophy which rejected innate ideas, and which traced intellectual conceptions to experience, ethical feelings to pleasure and pain, all under the sway of the potent law of association. But in 1826, when about twenty years of age, it dawned upon Mill that Bentham and his father had omitted from their scheme of life the all-important element



John Stuart Mill. (Photo by J. Watkins.)

of self-culture, which demands the development of the feelings and the imagination. The full extent of the change was apparent in two articles contributed by Mill to the London and Westminster Review (1838-40) on Bentham and Coleridge. The idea of the relativity of political constitutions, with which Coleridge had familiarized him, took firm hold of Mill's mind, and found elaborate expression in his book on Libertn, written in 1859. In order to correct the excesses of democracy, Mill advocated the representation of minorities, as also the adequate representation of intelligence as a controlling force. His Principles of Political Economy, which appeared in 1848, whilst professelly resting upon Ricardo's views, departed from them at crucial points, especially in the direction of socialism. In his Examination of Sir Wm. Hamilton's Philosophy (865) he strove

to strengthen the foundation of the experiential philosophy, but he never formulated a satisfactory theory of causation, or got over the difficulty of explaining the origin in the individual mind of ideas which had all the force of innateness. It was the same with the ethical difficulties with which Mill struggled in his book on Utilitarianism (1861), and in his Logic (1843). One of Mill's greatest works, this also bears marks of inadequacy when tested by the new view of the capacities and hereditary aptitudes of the human mind with which evolution has made the modern mind familiar. But perhaps the most striking evidence of the transition state of Mill's mind is the Essays on Religion, published after his death (1874). Mill's attitude towards religion revealed a mind pathetically groping for light rather than a mind contemptuously dismissing all groping as evidence of mental and emotional weakness. Mill was an carnest truth-seeker, and his life was as sincerc as his thinking. In his Essays, Mr. John Morley gives a beautiful picture of Mill in his last years; and the moral impression which he left upon those who differed most profoundly from him finds remarkable testimony in Gladstone's description of Mill as the 'saint of rationalism.' See Life by Bain (1882), and by Courtney (1889); also Douglas's J. S. Mill, a Study of his Philosophy (1895), and The Ethics of J. S. Mill (1897).

Milla, a genus of hardy liliaceous plants, natives of Mexico. There is only one species, M. billora, which is easily grown in any garden if it be afforded an open, sunny situation. It bears umbels of white salver-shaped

umbels of white salver-shaped flowers in late summer. Millais, SIR JOHN EVERETT (1829-96), English historical, subject, landscape, and portrait painter, was born at South-ampton. He won medals in the Royal Academy schools when he was eleven and thirteen, and began to paint when he was fifteen. In 1846 his Pizarro Scizing the Inca of Peru was exhibited in the Academy. He was elected A.R.A. in 1853, R.A. in 1864, and P.R.A. in 1895 on the death of Lord Leighton, and he was created baronet in 1885. Together with Holman Hunt and Rossetti, he was a founder of the Pre-Raphaelite Brotherhood. To this period belong his Is ibella, Christ in the House of His Parents, and Ophelia, pictures which were received with acute opposition. The tide of popularity flowed towards him after his Huguenot, which raised story-telling painting to the level of art. From truth to detail his aim developed naturally to truth

to impression; but he ever remained faithful to the use of fresh, vivid colour. In his Vale of Rest he wedded the Pre-Raphaelite Brotherhood method and manner to the finest traditions of English poetic art. The Escape of the Heretic is an example of his in-tensity of dramatic emotion and expression. He became the greatest of modern English painters, also the greatest portraitist. His long art career knew no break in effort, in achievement, in superb facility and versatility - qualities the attributes of a genius that, in his case, lay in masterly powers of technique, ordered by his mind and controlled by his temperament. Among his finest portraits are his own in the Uffizi, Florence; Carlyle, Gladstone (1885), Cardinal Newman, Lord Salisbary, Lord Beaconsfield, Mrs. Jopling: and an admirable series of chil dren's portraits. He is admirably represented in the National Portrait, the Tate, and National Galleries, in Birmingham, Man-Galleries. And the Walker Art Galleries. See Millais and his Works, by M. H. Spielmann (1898); Life, by Sir Walter Arm-strong (ed. 1897); Holman Hunt's The Pre-Raphaelite Brotherhood (1905); and Millais: Life and Letters, by his son (ed. 1901).

Miliard, Everyn, English actress, born in London, first appeared in a stock company at Margate (1891). She acted at the Adelphi (1891-3); with George Alexander (1894-6), scoring a great success as Flavia in the Prisoner of Zenda; with Beerbohm Tree (1898) as Portia in Julius Caesar, Glory Quayle in Hall Caine's Christian (1899), and Francesca in Stephen Philips's Paolo and Francesca (1902).

Millau, or Milhau (anc. Mmiliau, or Milhau (anc. Mmilianum), tn., dep. Aveyron, France, on Tarn R., 48 m. N.E. of Albi, is in the centre of a coal field, and has manufactures of gloves and wool. It was in mediaval times a strongly fortified place, and during the religious wars a Calvinist stronghold. Pop. (1901) 18,701.

Millbauk Peiscon.

Millbank Prison, formerly known as 'the Penitentiary.' Pimlico, London, was built (1813-16), the outcome of the efforts of John Howard and others for prison reform, on the site of the present Tate Gallery. The intention was by well-regulated hard labour and religious instruction to reform the criminal. The penitentiary system failed completely, and in 1843 ordinary prison methods were adopted. In 1870 it was made a military prison. Millbank was finally condemned as insanitary, and on the completion of Wormwood Scrubs (1891) the prisoners were

transferred there, and the buildings demolished. See Major Griffith's Memorials of Millbank (1875).

Millboard, board made chiefly from the refuse of paper material. The best quality, used for bookbinding, is made from hemp, rope yarn, cotton or linen rags, and by hand in moulds; but most millboard is now made on a single cylinder machine. The fibres of pulp adhere to a cylinder covered with a mesh of fine wire, which revolves in the vat and passes them on to a continuous roll of felt, and it in its turn passes between a pair of press rolls, which squeeze out the water. The sheet of paper then winds round the top roll until the required thickness is reached, when it is cut off and dried. An inferior board known as strawboard is frequently used as a substitute for millboard.

Millennium, a term applied in theology to the thousand years during which Satan will be bound, and the martyred saints live and reign with Christ (Rev. 20:2, 3). This long triumph is to be pre-ceded by the decisive victory of Christ over the adversary, and followed by a general resurrection, and the temporary release of Satan; then come the last judgment and the new heaven and new earth (Rev. 19-21). The term chiliasm or millenarian-ism is usually applied to the literal interpretation of these and other passages, conjoined with the expectation that the thousand years will be heralded by the second advent of Christ. Like many other Christian and heretical beliefs, chiliasm has its roots in the Old Testament. The prophets of Israel predict an era of triumph for their nation, to be ushered in by the coming of the Messiah (Isa. 9:6; Zech. 9:9f.; Dan. 2:44). The apocryphal, apocalyptic, and Talmudic literature amplify the conception with many extravagant details, often mutually inconsistent. In the Book of the Secrets of Enoch (33:1, 2) we find the prediction of a thousand years of rest fol-lowing six thousand of work, according to the analogy of the sabhatical week (cf. Ps. 90:4), to be succeeded by the eighth eternal day of bliss. Here we have, probably, the origin of the mille-narian teaching of Revelation, and some interpreters find the same doctrine in 1 Cor. 15: 23 f., placing the personal reign of Christ—i.c. the millennium between His advent at the resurrection and His final deliverance of the kingdom to the Father. These conceptions laid a strong grasp upon several of the fathers, particularly in view of Gnostic speculation: we find them in



A Picture by Sir John Everett Millais—'The Vale of Rest.' In the Tate Gallery.

Papias, Barnabas, Justin, Irenæus, Tertullian (who treated the theme in De Spe Fidelium, now lost), and Hippolytus. The Montanists, however, who not only accepted the grosser forms of chiliasm, but even proclaimed the imminent approach of the millennium, went to such excesses of superstition and prac-tice as to bring discredit upon the whole idea. Origen and Dionysius of Alexandria, as leaders of the allegorical school, made a most effective stand against them, and practically routed their fanaticism in the East, while it lingered on in the West till Augustine gave it its death-blow. From that time till the present millenarianism has never obtained the official recognition of the church, though both in mediæval and in modern times it has avai and in modern times it has reappeared, and has been maintained with great pertinacity. It has had the support of such great names as Whiston, Sir Isaac Newton, Bengel, Spener, Lavater, Charles Wesley, Toplady, and even Franz Delitzsch, Luthardt, and Goldt. One of Luthardt, and Godet. One of the most prominent of its recent of London. See Volck's Der Chiliasmus (1869), Bonar's Coming of the Kingdom of the Lord Jesus (1849), D. Brown's Second Advent (1846), Seiss's The Last Times (1878), Briggs's Lutheran Quarterly for 1879, and Salmond's Christian Doctrine of Immortality (ed. 1902,.

Millepedes constitute together with centipedes the class Myriopoda. They differ from centi-pedes in being vegetarian in habit, and in being harmless, because devoid of poison claws; externally, they also differ in having cylindrical instead of rounded bodies, and in appar-ently bearing two pairs of legs to each segment instead of only This appearance is due to the fact that the segments are



imperfectly separated from one another. One of the commonest of British millepedes is *Iulus terrestris*, sometimes called wireworm' by gardeners, though this name strictly belongs to the larva of an elater beetle. It is found about the roots of grasses and other plants, and this sub-

terranean habit is very characteristic of the class. When exposed by the digging up of the plant, Iulus makes no attempt to escape as would a centipede in like conditions, but merely rolls itself up and remains passive. It is protected from many adversaries by the stink-glands, whose secre-tion is powerful and repellent in odour. The name 'millepede' is inaccurate, for some millepedes have only thirteen pairs of legs. See Myriopoda.



Hugh Miller.

Millepores are corals belonging to the same class (Hydrozoa) as the little fresh-water hydra, whereas the majority of corals belong to the class of the sea-anemones. The millepores are found in warm seas, and are colonial forms, the colony consisting of a number of different kinds of individuals. See Collen-TERA, CORAL, and HYDROZOA.

Miller, Hugh (1802-56), Scottish geologist and man of letters, was born at Cromarty, and was apprenticed to a stone-mason, then became accountant in a bank at Cromarty (1834), contributed to Tales of the Borders (1835), and was made editor of The Witness (afterwards his own property), in which he advocated Free Church principles (being only second to Chalmers in his influence), reform in education, franchise, entail and game laws, while resolutely opposing Chartism and strikes. In The Witness (1840) appeared The Old Red Sand-stone, in which he demonstrated the existence of fossils in that formation. These articles were admired by Buckland and Hux-ley, whilst Agassiz named one of the fossils, discovered and described, in honour of the author —Pterichthys Milleri. His other important works are First Impressions of England and its People (1845), Footsteps of the Creator (1847), My Schools and Schoolmasters (1852), and The Testimony of the Rocks (1857). In his last days his reason failed, and he shot himself. See Life and Letters, by Bayne (1871), and Mackenzie's Hugh Miller: a critical Study (1905).

Miller, JOAQUIN (1842), pen-ame of Cincinnatus Heine name of Miller, poet of the Sierras, born at Wabash, Indiana. He studied law at Oregon, but left for the gold mines (1861). He edited the Eugene Democratic Register (1863), an anti-war paper, sup-pressed for alleged treason; practised law in Canon city (1863-6), and was county judge, Grant co., Oregon (1866-70). He has published Songs of the Sierras (1871), Songs of the Sunlands (1873), Songs of Italy (1878), and other volumes; a successful play, The Danites, and a History of Montanu (1886). Complete Poetical Works appeared in 1902.

Miller's Thumb. See Bull-

Millet, a cereal which is a food of the first importance in the East as well as throughout It is especially suited Africa. for cultivation in those countries in which little rain falls, and the soil is too poor and sandy for wheat or even maize. It is a small grain, not much larger than a pin-head, being



Millet. Spicule opened out; 2, spicule in fruit;
 caryopsis; 4, section.

the seed of a grass, Panicum miliaceum, which grows almost twelve feet in height, and pro-duces its seed in a tuft at the

summit of its stem. In the Crimea it is used for making a fermented drink called 'buza,' in flavour said to resemble weak, sour sherry. De Candolle shows that the cultivation of this plant is prehistoric in the south of Europe, in Egypt, and in Asia. The Greeks knew it, as also did the Latins. The Swiss lake-dwellers made great use of millet, and it has also been found in the lakedwellings of Varese in Italy. In China millet is one of the five plants which the emperor sows each year (since 2700 B.C.) in a public ceremony

Millet, AIME (1819-91), French sculptor, born at Paris. He began to exhibit in 1842, and created a great sensation by his Ariadne (1857), bought for the Luxembourg, Paris. His master-piece is the colossal Vercingétorix at Alise-Ste.-Reine in Côte-d'Or (1865). Other works are Apollo surmounting the grand opera, Mercury at the Louvre, and many portraits. See Life in French by Dumesnil (1891).

Millet, Francis Davis (1846), American artist, born at Mattapoisett, Massachusetts. Heserved in the civil war, and afterwards acted as war correspondent to the Daily News in the Russo-Turkish war, and to the Times in the Philippines expedition. He was director of decoration at the Chicago Exhibition (1893). He eventually settled in England. He has painted Between Two Fires (National Gallery, London),

At the Inn, and A Cosy Corner. Millet, JEAN FRANÇOIS (1814-75), French painter of the dignity and pathos of field life and labour, born at Gruchy, near Cherbourg, of peasant parents. In 1837 he went to Paris to study under Delaroche. Till 1844 he suffered great privations. He served in the revolution of 1848, and next year settled at Barbizon, beside Diaz and Rousseau. There he produced his finest works, such as The Sower, The Gleaners, and The Angelus. Much of his work is in private collections. He is well represented in the Louvre, Hertford House, the National Gallery, London, and the British Museum. His Angelus, for which Museum. His Angelus, for which he himself could not get £80, sold eventually for £22,120. See The Barbizon School, by D. C. Thomson (1890); Millet and the Barbizon School, by A. Tomson (1904); The Life and Work of J. F. Millet, by Alfred Sensier (Eng. trans. 1881); Life and Letters, by Mrs. Ady (1903); and J. F. Millet, by Yriarte (1885); also, The Drawings of Jean François Millet, with Introductory Essay by Leonce Bénèdite (1906).

Milletia, a genus of climbing leguminous trees and shrubs, mostly natives of Africa and

The evergreen M. mega-Asia. sperma, however, is a native of Qucensland, and is cultivated in gardens for the beauty of its panicled racemes of purple flowers. The leaves are imparipinnate.

Milligan, WILLIAM (1821-93), Scottish theologian, was born at Edinburgh, and was minister of the Church of Scotland at Cameron in Fifeshire (1844), and at Kilconquhar (1850). He was appointed professor of divinity and Biblical criticism in the University of Aberdeen (1860), and was moderator of the General Assembly (1882). He published Baird Lectures on St. John (1886), The Resurrection (1890), and Ascension of our Lord (1892).

Millinery, the art of making and trimming headgear for ladies and children. The milliner's gift, the natural perception of what is becoming in line, form, and colour to different types of face, head, complexion, and general appearance, must be carefully cultivated by observation, experiment, and the study of good

models.

The standard head-covering is the hat, and undoubtedly the standard material is straw, which is used at all seasons, and by wearers of all ages; other ma-terials that are used are felt, velvet, cloth, and silk. The hat, the headgear of young wearers, has a brim all the way round; this may be broad and shady, raised at one side, or curled up, but the brim is the distinctive feature of the hat. Technically, the hat consists of three sections —crown, side-band, and brim; and sometimes a fourth, the standing brim edge, is included in hat shapes that are of a Spanish or turban style. Bon-nets are the usual wear of middleaged and elderly ladies, and are made of similar materials to the hat. Modern bonnets vary much in shape, but as a general rule they are more compact than the hat; they have a brim which sits close to the head, and the trimmings must include strings, which fasten under the chin. The toque differs from the ordinary hat in having an upturned brim, which is thickened in outline by draped or other swathed trimming. Dress caps are the indoor wear of elderly ladies. The slight foundation is of wire and French net, over which lace or other transparencies are arranged; the trimming is generally light floral sprays and dainty-tinted ribbon. Milliners make a marked distinc-tion between the 'trimmed' hat and the 'made' hat. The former term is applied to the shape manufactured from straw, felt, jet, or other material ornamental in itself, and which only requires trimming and lining; the latter

term describes a foundation shape completely covered with closely fitted or partly draped rich fabric, and finally trimmed, of which the velvet hat is a fa-miliar example. A large proportion of the buckram shapes used for covered hats are manufactured wholesale; but the ex-clusive shapes used in the best class of work are hand-made, as the high-class milliner must design and execute the whole from first to last to grace the personality of the wearer, to combine with the other details of the toilet, and to meet the requirements of season and occasion. Hand-made straw hats are made of soft, fanciful straw braids, and are worked to shape with the aid of wire or thread run through the edges, and slightly stiffened by steam and hot pressing. Felt hats can only be trimmed; the manufacture of the shapes is a trade in itself. But exclusive styles in felt are produced by the milliner cutting, folding, and twisting this soft, pliable texture into graceful and novel forms. Where millinery is taught as a technical subject the candidate for examination is expected to execute the pieces of specimen work unaided from the beginning from the making of pattern and shape to the last detail of trim-ming and finishing. The pattern for a shape may be made in several ways. An old but not very reliable way is to cut one 'by the eye.'
The trade custom is to take one from another, moulding it in tissue paper from the inside of the model. The technical method, which is found most practical and useful, is to draft out patterns by geometrical rules.

The materials in general use for shapes are:—Spatra (espatra), a firm yellowish texture of woven esparto grass, backed by firm white muslin; the smoothest side, the muslin one, is always made up as the right side. This material is the best for wear, but is inclined to chip at the cut edges in making up, unless care-fully handled. Buckram, the next most durable material, is a coarse, highly-stiffened muslin, not quite so firm as spatra, made in black and white. Spatra and buckram shapes are most frequently chosen where velvet and similar rich coverings are used, as these require a firm support. French net is used where the coverings are of lighter weight. The net is rather open, and is highly stiffened, but it is rendered soft if much handled; it is made in black and white. Shapes are often made of two materials, a brim of spatra or buckram and a crown of French net, when the brim is required to look stiff and the crown soft.



A famous Picture by J. F. Millet—'The Gleaners,'



Millinery in the Eighteenth and Nineteenth Centuries.

In all shape-making, cotton-covered wire (black or white) is used to strengthen and support each section, and it is strongly overcast to the edges of the sections before they are joined together. Wires covered with coloured silks, or with gold and silver tinsel, are used to make the 'skeleton' or 'frame' shapes for transparent headgear of tulle, or for heavy but open coverings (such as jet or passe-menteric), which require a strong but almost invisible support. Bandeaux, curved pieces which raise one part of the headdress from the head, and support trimmings arranged under the brim, are made from any of these shape-making materials; but French net is the favourite for this purpose, as it is the lightest in weight. Head-linings are important in millinery. They are usually made of sarcenet cut into two sections—the 'tip,' which fits into the crown, and is of a round or oval form; and the headlining proper, which runs around the inside of the side-band. This is merely a strip cut on the cross of the material. One edge is hemmed, and has a narrow china ribbon inserted in the hem; the other is sewn carefully to that line of the hat along which the inner edge of the brim and side-band meet. The hemmed edge is then drawn up by the ribbon to fit the inside of the hat. These linings are often made of net or chiffon when required for transparent headgear, in which case the tip is dispensed with. Of made trimmings there is an endless variety, as they change from season to season. Bow-making is an art in itself, as there are so many different forms of bow, and almost every kind of ribbon and material is used to make them, while each ribbon requires special treatment. Upstanding or wide loops must be wired or otherwise supported; lengths of cut material, 'piece trimming,' need various hems or bindings to finish the edges; in place of the woven purl edge of ribbon, many bows and ends of piece trimming are lined with contrasting colours or materials, such as velvet with silk. All children's headgear is made on much the same princi-ples as that for ladies; but very often for soft, close-fitting bonnets the only stiffening between lining and outer covering is book muslin or flannelette. In business, not only are taste and skill required, but great care in keeping stock, which is costly and perishable. See Handbook of Millinery, by Madame Rosée (1895); Practical Millinery, by Jessica Ortner (1897); Millinery, by C. Hill (1900); and Practical Home Millinery, by Amy J. Reeve (1903).

Millipeds. See MILLEPEDES. Millom, tn., Cumberland, England, 16 m. by rail from Barrowin-Furness; has mines of hæmatite ore and iron works. Pop. (1901) 10,426.

Millport, summer resort, on Great Cumbrae I., 5½ m. s.s.w. of Largs, Buteshire, Scotland; with a marine biological station and museum. Pop. (1901) 1,663.

Mill Springs, vil., Wayne co., Kentucky, U.S.A., 10 m. w. of Somerset, where, in January 1862, the Confederates were defeated by the Evderales

the Content by the Federals.

Millstones. The burr stones of France (Seine-et-Marne) are excellent for this purpose, as they are hard and porous, though to make large millstones they require to be carefully pieced together. Many sandstones and grits are also used; but as they wear smooth in course of time, they require to be occasionally dressed afresh. The millstone porphyry of Hungary is a vesicular siliceous rhyolite. In place of stones, steel rollers are now largely employed.

Miliville, city, Cumberland co., New Jersey, U.S.A., on the Maurice R., 40 m. s. of Philadelphia. It manufactures glass and iron, cotton, and has bleach and drowed by Pau (1909) 10 589.

and dye works. Pop. (1900) 10,583. Milman, HENRY HART (1791-1868), dean of St. Paul's, was born in London. In 1818 he born in London. was presented to the living of St. Mary's, Reading. In 1821 he became professor of poetry at Oxford. Peel, in 1835, ap-pointed him canon of Westminster and rector of St. Margaret's; and in 1849 Lord John Russell presented him to the deanery of St. Paul's. Milman published in 1815 Fazzo, a drama; an epic, Sumor, the Lord of the Bright City (1818); and the dramatic poems, The Fall of Jerusalem (1820), The Martyr of Antioch and Belshazzar (1822)all descriptively and even dramatically strong, and containing occasional felicitous lyrics. Milman made some notable contributions to Heber's Hymns (1827). He published in 1830 the History of the Jews, treating his subject historically, and subordinating the importance of miracles. The work provoked sharp and conflicting criticism, and served to establish a new standpoint in the examination of Biblical history. It was enlarged, with a vigorous reply to critics, in 1863-7. In 1838 Milman produced a useful annotated edition of Gibbon, and in 1839 his Life. In 1840 he issued his collected Poems. the same year his History of Christianity under the Empire was coldly received. But his highest achievement is the History of Latin Christianity down

to the Death of Pope Nicholas v. (1855). In 1868 Milman's son completed and published his father's Annals of St. Paul's. Among his hymns are: When our heads are bowed with woe; Brother, thou art yone before us; and Ride on, ride on in majesty! See Life by A. Milman (1900).
Milne, Sir David (1763-1845),

Milne, Sir David (1763-1845), British admiral, was born in Edinburgh. He was present at Darby's relief of Gibraltar, also taking part in the capture of the Santa Leocadia in 1782. In the same year he participated in the battles of St. Kitts and Les Saintes. He assisted in the capture of the Pique in 1795; the capture of the Pique in 1795, but was wrecked; and in 1800 captured the Vengeauce. In 1816 he accompanied Lord Exmouth, as second in command, for the bombardment of Algiers. In 1841 he was made an admiral.

Milne, John (1850), English mining engineer and scismologist, born at Liverpool. He worked as mining engineer in Newfoundland and Labrador, and as geologist to Dr. Beke's expedition to Arabia. For twenty years he was geologist and mining engineer to the Japanese government, establishing a scismic survey of Japan (about 1,000 stations), and is now establishing a similar survey of the world. He is author of Earthquakes (ed. 1898) and

Scismology (1898).

Milne - Edwards, HENRI (1800-85), naturalist, was born at Bruges, his father being an Englishman. For some time he taught at the College of Henri IV. in Paris; later, filled Cuvier's place at the Academy of Sciences; and subsequently became (1862) professor of zoology and physiology at the Jardin des Plantes. Paris. He was a prolific writer, and his Eléments de Zoologie (1834) won him a great reputa-tion. Another work of much importance was his Histoire Naturelle des Crustacés (1834-40); this was followed by the Histoire Naturelle des Coralliaires (1857 60), and by a monumental work. Sur la Physiologie et l'Anatomie Comparée de l'Homme et des Animaux (1857-81), in which he was assisted by his son, Alphonse Milne-Edwards. Although the contemporary of Darwin and Huxley, Milne-Edwards was but little influenced by the new thought, and to the last held to the doctrine of special creations.

Milner was called to the bar.

(Inner Temple) in 1881, but engaged in journalistic work, chiefly as a member of the staff of the Pall Mall Gazette, of which Mr. John Morley was then the editor. In 1887 he became private secretary to Mr. (now Viscount) Goschen, and in 1889 under-secretary for finance in Egypt. From 1892 to 1897 he was chairman of the Board of Inland Revenue. In 1897 he was sent out to be high commissioner for S. Africa and governor of Cape Colony. In Rovernor of Cape Coolly. In this capacity he conducted with President Kruger the delicate negotiations that immediately preceded the outbreak of the Boer war of 1899 1902. On the conclusion of that war he was appointed governor of the Transvaal and Orange River Colonies, and held the post until he resigned in March 1905. In 1901 he was created a baron, and in 1902 a viscount. He has written England in Egypt (7th ed. 1899), and Arnold Toynbee (1895). See Luke's Lord Milner (1901) and G. B. I. Müller's Lord Milner and South Africa (1902).

Milner, John (1752-1826), English Roman Catholic bishop and archæologist, born in London. He entered Douai College (1766), and was appointed titular bishop of Castabala in Cappadocia (1803), taking a leading part in the struggle for Catholic emancipation. He published a History of Winchester (1798), and Ecclesiastical Architecture in England during the Middle Ages (1811).

Milner, Joseph (1744-97), English ecclesiastical historian, born at Leeds. He obtained the vicarage of North Ferriby, near Hull (1780). His chief work is a History of the Church of Christ (1794-7), evangelical in tone, which was completed after his death by his brother, Isaac Milner, dean of Carlisle. Complete Works, with Life by Dean of Carlisle (1810).

Milnes, Richard Monckton.

See HOUGHTON, LORD.

Milngavie, tn., Dumbartonshire, Scotland, 6 m. N.W. of Glasgow; has bleach fields, dye works, and a paper mill. Pop. (1901) 3,481.

Milo (anc. Melos), isl. of the Cyclades, belonging to Greece, in the Ægean Sea, some 70 m. N. of Crete, 14 m. long by 8 m. broad. Volcanic in origin, it rises in Mt. Prophet Elias to 2,548 ft. It is rich in sulphur, manganese, gypsum, and salt, and has lead, zinc, clay, and obsidian. Chief tn. Plaka, near the ancient city of Melos (where the Venus of Milo in the Louvre, Paris, was discovered in 1820). Here many prehistoric remains have recently been found. In later times the island was colonized by Dorians, and in the Peloponnesian war it

took the Spartan side. In 416 B.C. the Athenians took the island, massacred all the adult males, and sold the women and children as slaves. Pop. 4,959. Sec Annual Report (Nos. iii., iv., v.) of the British School at Athens, and Excavations at Phylakopi in Melos, by A. J. Evans, D. G. Hogarth, and others (1904).

Milo, or MILON, of Croton, in ancient Italy, was famous for his bodily strength: he was six times Milrei, or MILREA, a Portuguese coin of 1,000 reis, and the unit of their currency. Formerly of silver, it is now only coined in gold, and equals 53°28d. sterling.

Militades, the famous Athenian, son of Cimon, was born probably about 540 B.C. He first appears in history as tyrant of the Thracian Chersonese, and accompanied Darius on his Scythian expedition about 512 B.C. After the suppression of the Ionian



Viscount Milner.
(Photo by H. Walter Barnett.)

victor in wrestling, both at the Olympian and Pythian games. He was the general of the Crotoniate army in the great battle against the men of Sybaris in 511 B.C., which resulted in the destruction of the latter city. He was a follower of Pythagoras.

Milo, TITUS ANNIUS, tribune of the commons in ancient Rome in 57 B.C., aided Cicero's recall from exile. In 52 he was tried for killing Clodius in a fray, and, though defended by Cicero, had to go into exile at Marseilles.

to go into exile at Marseilles.

Milot, tn. of Haiti, 9 m. s. of
Cap Haytien. Pop. 6,000.

revolt in 494 B.C. he went to Athens. Then he was brought to trial for his oppressive rule in the Chersonese, but was acquitted by his countrymen, in view of the gift he brought them of the islands of Lemnos and Imbros. When the Persian expedition under Datis approached Attica in 490 B.C., Miltiades urged the policy of marching out from Athens to attack the Persians at Marathon. But there is little doubt that later tradition gave Miltiades an undue share of the credit of the victory, to the injury of Callimachus. Shortly

afterwards he besieged the city of Paros unsuccessfully, and returned home wounded. For this failure he was fined fifty talents (£12,000).

Milton. (1.) Town, Norfolk co., Massachusetts, U.S.A., 7 m. s. of Boston. On Blue Hills is the site of an observatory and station of the United States Meteorological Bureau. There are granite quarries. Pop. (1900) 6,578. (2.) Borough, Northumberland co., Pennsylvania, U.S.A., on the Susquehanna R., 67 m. N. of Harrisburg: has manufactures of cars, machinery, and nails. Pop. (1900)

6,175.

Milton, JOHN (1608-74), England's greatest epic poet, was born in Bread Street, Cheapside, his father being a scrivener. He went to Christ's College, Cambridge, in 1625, where his most emi-nent Cambridge contemporaries were Thomas Fuller, Jeremy Taylor, and the poet Waller; and in his own college, More the Platonist, and the satirist Cleveland. The public orator at that day was the saintly George Herbert. Milton was distinguished, but at first scarcely popular, among his undergraduate compeers, who called him 'the Lady,' from the refinement of his manners and Ere Milton left appearance. Cambridge his father had retired to Horton in Buckinghamshire, and here the poet lived with him for about six years (1632-8). He had written during the Cambridge period the Ode on the Nativity, the lines on Shakespeare (prefixed to the second folio), the sonnets To the Nightingale and On Arriving at the Age of Twenty-three. At Horton Milton wrote the hexameters Ad Patrem; the companion poems L'Allegro and Il Penseroso; Arcades, the fragment of a masque; the verses At a Solemn Music; the masque of Comus, presented at Ludlow Castle by the family of the Earl of Bridgewater;' and Lycidas, on the death of Edward King, drowned in the Irish Sea. In this beautiful monody Milton's views on the corrupt state of the English Church were expressed with singular freedom.
The sojourn at Horton coincided with the domination of Laud and Wentworth in church and state, and Milton betook himself to foreign travel. 'At Florence,' he says, 'I visited Galileo, a prisoner to the Inquisition.' He had pre-viously met in Paris the famous Grotius; at Rome he heard Leonora Baroni sing, and praised her in Latin elegiacs. He saw the venerable Manso, Marquis of Villa, the Mæcenas of his day, at Naples, and to him addressed Latin hexameters. Meanwhile (1638) his friend Diodati had died in England. The Epitaphium

Damonis commemorates this loss: it is a Latin Lycidas.

After Milton's return to England he lodged in St. Bride's Churchyard, Fleet Street, and took charge of his sister's children, Edward and John Phillips, soon moving, however, to 'a pretty garden house' in Alders-gate Street. From this date (1640) commences the long period during which Milton almost abandoned poetry for polemics in prose. Two anti-episcopal pamphlets by him appeared in 1641 and 1642; in these he replies to Bishop Hall and Archbishop Usher. He took up the cause of 'Smectymnuus'—a name composed of the initials of the Puritan divines who joined in this controversy, one of whom was Thomas Young, his former tutor. In 1643 he married Mary Powell, daughter of an Oxfordshire royalist, with an encumbered estate, and in debt, amongst others, to Milton himself. She was but seventeen, he twice her age, and severe in principles and temper. She quitted him after a month. After a fruitless attempt to recover her, he concluded that he might justly repudiate her. One consequence was that he wrote those pamphlets on the Doctrine and Discipline of Divorce (1643), which brought him into disfavour with the Presby-He did less questionterians. able service to the cause of enlightenment in the brief Tractate of Education (1644), and in Areovagitica (1644), a noble vindication of the liberty of the press.

Meanwhile his father had come to live with him; and the Powells, more impoverished than ever by the civil war, induced him to take back their daughter, and upon his removal to a house in the Barbican took shelter with him themselves. His father and Mr. Powell died early in 1647, in which year the Presbyterian ascendency was supplanted, to Milton's relief, by that of the Independents. In the same year he gave up teaching, and removed to a smaller house in High Holborn. Before the execution of Charles I. he had almost completed his Tenure of Kings and Magistrates, in which he maintained that it was lawful to put a 'wicked king' to death. Its publication, in February 1649, marked Milton as the best apologist for the new régime, and he was made Latin secretary to the Council of State. He shifted his dwelling first to Charing Cross, then to Scotland Yard, near Whitehall, the meeting-place of the council. His Eikonoklastes (Image-Breaker) (1649) was an answer to Eikon Basilike (Royal Image), the work at the time and long afterwards believed to be by Charles 1. This was followed (1651) by his Defensio Populi Anglicani, in reply to the Defensio Regia, published in Holland (1650), and written by Salmasius. The controversy made the name of Milton famous on the Continent. In 1652 he removed to a pretty garden house' in Petty France, Westminster, and from this year must be dated also his blindness. In 1653 or 1654 his wife died, and in 1656 he married Catherine Woodcock, daughter of a Puritan captain of Hackney. His second wife he lost fifteen months afterwards; she died in childbirth, berself and child. In a beautiful sonnet ('Methinks I saw my late espousèd saint') Milton has made immortal this touching episode in his life. In the last year of Cromwell's life was begun Paradise Lost, originally projected in 1639 or 1640 as a drama. In the succeeding anarchy Milton pleaded for a republic, and against militarism and any form of church establishment, and on the very eve of the restoration wrote The Ready and Easy Way to Establish a Free Commonwealth (1660), as against 'the inconveniences and dangers of readmitting kingship.' After the return of Charles II., Milton was arrested, about the time that his Eikonoklastes and Defensio were publicly burnt by the hangman (September 1660), but was released on payment of fees to the sergeantat-arms. Upon his release he dwelt successively near his residences of earlier days, in Holborn and in Jewin Street, near the Barbican. His amanuensis was young Thomas Ellwood, a Quaker. His daughters neglected his comfort, and in 1663 he married Elizabeth Minshull, his junior by thirty years—an arrangement which brought order but not peace to his household. Soon after this he lived in Artillery Walk, near Bunhill Fields; but in the year of the great plague, that neighbourhood being chosen as a 'pest-field,' he sought refuge at Chalfont St. Giles, Buckinghamshire, taking with him the completed manuscript of Paradise Lost. In 1667 it appeared, and extorted the admiration even of royalists, including Dryden. Of his prose works at this period perhaps the most important were his History of Britain to the Conquest (1649), and a tract Of True Religion, etc. (1673). More memorable was the publication in one volume together (1671) of Para-dise Regained and Samson Ago-nistes. The Graco-Hebrew drama Samson Agonistes has a very obvious parallel in the poet's own fate. Milton was buried in St. Giles's Church, Cripplegate.

His De Doctrind Christiand, published in 1825, discloses the



Milton, Cromwell's Latin Secretary, dictating dispatches to Andrew Marveil, Assistant Secretary. 'Cromwell, Protector of the Vaudois,' by Ford Madox Brown.

fact that Milton was an Arian as well as an anti-Calvinist, and makes it manifest that he was an independent and even eccentric thinker, attached to no church system, Puritan or other. Even in his lifetime his genius had van-quished prejudice, and at a later date the High Church Tory Atterbury was amongst his most en-thusiastic admirers. The trend of literary as well as ethical and political opinion was against him; poetry was gradually shaping it-self into the form which it assumed under Pope and his successors; and none of Milton's contemporaries could have imparted to blank verse the majestic harmony which made Paradisc Lost an effective protest against the bondage of rhyme. By far the most comprehensive and exhaustive work on Milton is Professor Masson's Life of Milton (1859-80); and his edition of the Poems (3 vols., Macmillan) is complete and masterly. The earlier editions by Bishops Newton and Todd deserve mention; also the Life by Mark Pat-tison (1879). Very excellent editions of several poems, by A. W. Verity (1891-8), are published by the Clarendon Press; there is a valuable treatise on Milton's prosody by the poet Robert Bridges (1893), and a complete concordance to the *Poems* by Dr. Bradshaw (1894).

Miltonia, a genus of Brazilian epiphytal orchids, mostly of great beauty, and producing flowers of considerable size. They require abundance of light, yet shade from intense sunshine, an intermediate temperature, abundance of water during the period of growth, and a moderate supply at all times. They like a compost of sphagnum moss and peat.

Milwaukee, city, Wisconsin, U.S.A., cap. of Milwaukee co.. on w. shore of Lake Michigan, The United States government building is a massive granite structure, with a library of 120,000 volumes. The city is the seat of many educational establishments, and its parks cover 500 ac. The principal manufactures are foundry and machine-shop products, malt liquors, leather, iron and steel, and flour. Pop. (1900) 285,315.

Mimamsa, a system of commentary and interpretation of the Vedas, or sacred books of Hinduism. It consists of two parts—(1) Purva-Mimamsa or Karma-Mimamsa, and (2) Uttara-Mimamsa or Brahma-Mimamsa, better known as the Vedanta. Its object is to explain the religious rites and dutios enjoined in the Vedas, and to set forth the merits that attach to them respectively. These commentaries are embodied in a series of sutras or aphorisms. Jaimini, a sage, was the founder

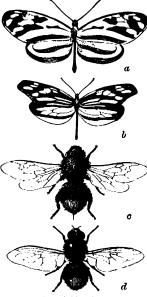
of this school of interpretation, and the standard introduction to the study of the *Mimamsa* is one by Madhaya Acharya.

M.I.M.E., member of the Institute of Mining and Mechanical Engineers.

Mime. See Mimus.

M.I.Mech.E., member of the Institution of Mechanical Engineers.

Mimicry. It happens not infrequently among animals, notably among insects, that a form is found to resemble in outward appearance, not its own immediate allies, but some other unrelated form. Mr. Bates studied



Examples of Mimicry among Insects.

(a) Heliconius telchinia, offensive in odour and taste; and (b) Diamorphia praxinar, which is protected by its resemblance to the former. (c) Bombus dechanellus; and (d) Folucella bombilans, a stingless fly, protected by its resemblance to the former.

this peculiarity in some detail among the butterflies of S. America, and gave the following explanation of it. He observed that the butterflies of the family Pieridæ show a marked resemblance in form and colour to those of the unrelated family Heliconidæ. The butterflies of this last-named family are stated to possess an offensive odour and taste, which render them obnoxious to insect-eating animals. It is, therefore, supposed that such animals are deceived by the resemblance between these butterflies and the (by hypothesis) edible Pieridæ, and therefore the latter are protected by their

resemblance to the Heliconidæ; and the intimate nature of the resemblance must be ascribed to the continued action of natural selection, by means of which the resemblance has been progressively accentuated. To this type of protective resemblance the name of mimicry has been given. The hypothesis was further elaborated by Fritz Müller, who endeavoured to explain the fact of mimicry as follows. A species is said to be mimetic if it be itself apparently edible and persecuted or liable to persecution by insect-eating animals and if it occupies the same geo-graphical area as another unre-lated and inedible species, and closely resembles in appearance this species, while differing markedly from its own immediate allies. Further, the incdibility of the mimicked species may, by hypothesis, be assumed if it dis-play that type of colour known as warning coloration (see COLOURS OF ANIMALS), which usually consists of a simple type of contrasted colours, such as black and white, black and red, red and yellow, and so on.

With regard to the striking resemblance between the flies of the genus Volucella and certain bees and wasps, Professor Lloyd Morgan offered to an incubator chick a wasp. The chick imme-diately took the wasp, but was apparently stung; at least it spent some time afterwards wiping its beak on the ground, as though to remove some ill effects. Later the stingless Volucella was offered to the same chick. It refused the insect, and repeated the wiping movements of the beak previously practised, in-dicating a very distinct association of ideas between the colour of the two insects and some unpleasant experience. As a set-off against this experiment, however, several observers have stated that hens can distinguish between drones and worker bees, and have been known to station themselves near a hive and pick out the drones from the bees flying in and out Now the distinction between Volu cella and wasp is certainly much more marked than that between worker bee and drone. See further the books mentioned in the article COLOURS OF ANIMALS. The theory demands considerable intelligence in the persecuting forms, and it is doubtful if this intelligence is available except in the higher vertebrates, and these do not in all cases seem to be the greatest enemies of the animals which display mimicry. Thus, the phenomenon is most marked in butterflies, and the selecting agent in this case is supposed to be birds; but there is not sufficient evidence to show that

even unprotected butterflies are subjected to that unremitting persecution by birds which the theory seems to demand. See Drummond's Tropical Africa (1889); Bates's Naturalist on the Amazon (1863); Wallace's Tropi-cal Nature (1891); Poulton's Colcurs of Animals (1890); Beddard's Animal Colouration (1892).

Mimir, in Norse mythology, a giant owning the fountain of wisdom beneath the ash Yggdrasil, from which he allowed Odin to drink on his pledging an eye. Mimir, sent by Odin as a hostage, was beheaded by the Vanir. The head was embalmed by Odin and consulted as an oracle.

Mimnermus, Greek elegiac poet, born at Smyrna, of the race of the Colophonians, who reconquered Smyrna from the Æolians. He lived at the end of the 7th and beginning of the 6th century B.C. He first gave to the elegiac measure its melancholy character, and was the first to use it for love poems. Fragments are in Bergk's Lyrici Græci (1882).



Mimosa pudica. 1, Flower, opened; 2, fruit.

Mimosa, a genus of tropical and subtropical, mostly herba-ceous, plants belonging to the order Leguminose. They bear bipinnate leaves, and heads or spikes of small sessile flowers. M. pudica, generally called the sensitive plant, is a prickly plant bearing red flowers. Its leaves are sensitive to the touch, as also are those of the larger M. sensitiva, which grows from three to four feet in height.

Mimulus, a genus of hardy and half-hardy herbaceous plants belonging to the order Scrophulariaceæ. They mostly bear showy flowers with bilabiate corollas, the lower lips being trilobate,

They are of easy culture. Propagation is most commonly effected by means of seeds. M. moschatus is the common musk; M. cardinalis is a hardy perennial North American plant bearing large red flowers in summer; M. luteus is the common monkey flower.

Mimus, a mime, a name given in ancient Greece and Italy to a certain form of the drama. It originally grew from extem-porary imitations (the word means mimicry') of ordinary life given at certain festivals. mime was later on elaborated. especially by Sophron of Syracuse (about 420 B.C.). One mime at Rome dealt chiefly with ridiculous and indecent situations, and consisted largely of gesture. Greek mimes differed from Roman in being written in prose.

Mina, both an ancient weight and a certain money value, equal to the weight of the mina in silver. Like other Greek weights, it varied according as the Æginetan or Euboic standard was used, the latter being seven-tenths of the former. The Euboic standard was used at Athens for money, the Æginetan for merchandise. As a money unit (the mina was never coined) it was equal to 15% oz. of silver, or about £3, 18s. 6d. in English money.

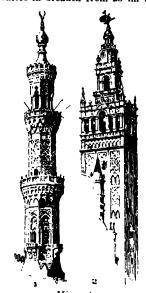
Mina. See MYNA.

Minahassa. See CELEBES. Minaret, a lofty tower of slender proportions decorating the Mohammedan mosque. It rises by a series of stories, on the landing of which there is an outlook balcony, from which the muezzin summons the people to worship. It is generally square at the base, passing into the circular form as it ascends. In Spain, the Giralda at Seville is an example of a minaret on a magnificent scale.

Minas Geraes, state of Brazil, lying N. of Rio de Janeiro. It is a country of mountains and plateaus, well watered by the São Francisco, Parahyba, and other streams. In mineral wealth it takes the first rank among the states of Brazil. Gold is worked, its diamond mines are well known, and iron exists over large The next important industries are wool-weaving and the making of cigarettes and leather articles. Coffee, tobacco, cotton, sugar, rice, and maize are grown, and the butter and cheese have a good reputation. Minas. or Bello Horizonte, is the capital (since 1894). Area, 221,945 sq. m. Pop. 3,500,000.

Minbu, tn., cap. of div. and of dist. of same name, Upper Burma, on r. bk. of the Irawadi. Area of div. 17,170 sq. m.; of dist. 3,297 sq. m. Pop. (1901) of div. 1,076,280; of dist. 233,377; of tn. 5,780,

Minch, arm of the Atlantic Ocean, separating the N.W. of the Scottish mainland from the N. part of the Outer Hebrides. It is 60 m. from N.N.E. to S.S.W., and varies in breadth from 23 m. to



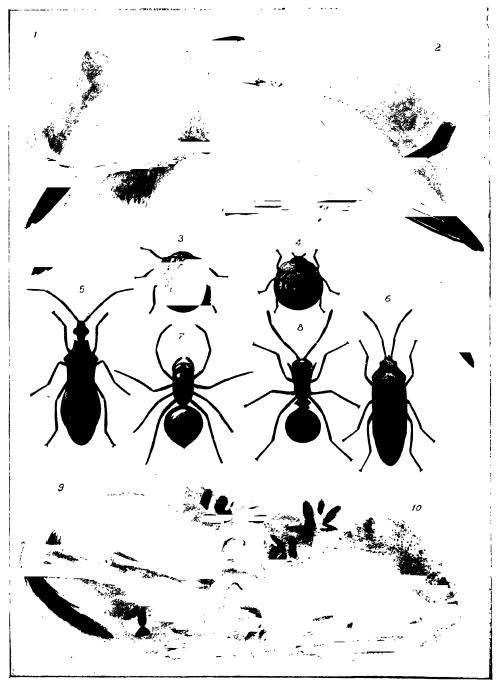
Minarets. Mosque of Saida Zeynab, Cairo. 2. The Giralda Tower, Seville.

45 m. The s. portion is con-tinued as the Little Minch for 46 m. between the island of Skye, in the Inner Hebrides, and S. Harris, N. Uist, and Benbecula in the Outer Hebrides. It varies in breadth from 14 m, to 20 m. The currents in the Minch are very rapid.

Mincio, riv. of N. Italy, l. bk. trib. of the Po. It rises in Lake Garda, and after a s.E. course of some 120 m. joins the Po 10 m. S.E. of Mantua. It was Virgil's

native stream.

Mind, English quarterly journal devoted to psychology and philosophy, was founded in 1876 by Dr. Alexander Bain. Another influential supporter was Professor H. Sidgwick, from 1891 to his death in 1900. The first editor of *Mind* was Professor Croom Robertson, who retired in 1891, and was succeeded by the present editor, Dr. G. F. Stout of Oxford. In 1900 a Mind Asso-ciation was formed to place the publication, which had hitherto been supported by private liberality, on a sound financial basis. Among the contributors to Mind have been Mr. Arthur J. Balfour, Herbert Spencer, Grant Allen, Mr. Francis Galton, Mr. Andrew Lang, Mark Pattison, and G. J. Romanes.



Minnery among Animals.

Between birds (1) crow and (2) cuckoo. Between Hemiptera and Calcaptera (3) Steganocerus multipunctatus and (4) Epilachus dregel. Between hemipteraus insects (5) Cotanopsis vitati and (6) Lygous (bullatis. Between spiders and ants-(7) Salticus inger and (8) Polirachus mavi). Between mammals-(9) squiriel and (10) shrew.

It happens not infrequently among animals, notably among insects, that a form is found to resemble in outward appearance some other unrelated form. This peculiar characteristic has received the name of mimicry, and has been ascribed to the continued action of natural selection. In most cases it is the chief means of protection that

Mind. See Psychology, Soul, and Soul and Body.

Mindanao, isl. of the Philippines, the farthest south of the large islands, and the second of the group in size, its area extending to 46,721 sq. m. It is crossed by three ranges of mountains. It possesses at least two navigable rivers, the Rio Grande (s.) and the Agusan (N.E.). active volcanoes, Apo (10,310 ft.) and Macaturin, exist, as well as many other craters regarded as extinct; and the island is very subject to earthquakes, one of which, in 1897, ruined the town The climate is of Zamboanga. tropical, but cooler than that of Manila, although over 400 m. far-ther south. The mineral wealth consists of gold, copper, platinum, and coal; dammar exists in some quantity, and vast beds of Coffee-growing is one of the chief industries. Pop. 499,634, divided into those of Malay origin; these again into the Christian Visayas and the Mohammedan 'Moros' of the south; Indonesians, of whom there are sixteen tribes, who are pagans; and Negritos or aboriginal tribes.

Minden, tn., prov. Westphalia, Prussia, on l. bk. of Weser, 39 m. by rail w.s.w. of Hanover; has a fine 13th -century cathedral. Woollen and linen goods, glassware, tobacco, and chemicals are manufactured. Here Ferdinand, Duke of Brunswick, gained a brilliant victory over the French, Aug. 1, 1759. Pop. (1900) 24,315.

Minderers Spirit, a solution of ammonium acetate, used in medicine both to promote sweating in feverish attacks and as a diuretic.

Mindoro, one of the Philippine Is., separated from Luzon by San Bernardino Strait. Mt. Halcon (8,860 ft.) is the highest point. Calapan, on the N.E. coast, is the capital, but steamers unload at Puerto Gubera, 20 m. N.W. Timber is exported; cotton, sugar, and hemp are cultivated; coal and sulphur are being worked.

Pop. (1901) 106,000. Mine. See Mining.

Mineo (anc. Menæ), tn., prov. Catania, Sicily, 25 m. w.s.w. of Catania. Pop. (1901) 9,934.
Mineralogy. The scientific study of minerals dates from the

Mineralogy. The scientific study of minerals dates from the end of the 18th century. The early treatises on minerals and stones of Theophrastus, the elder Pliny, and Avicenna have little scientific value. In 1546 Agricola described many minerals under names which still persist—e.g. quartz—and enumerated their properties so clearly that it is possible to identify many of them. In 1669 the Dane Nicolaus Steno ascertained the constancy of the angles of crystals, and Abbé Haiy (1743–1822) explained the laws which

underlie the diversity of crystalline forms. About the same time Werner, the Saxon mineralogist, and his disciples, investigated the external properties and mode of occurrence of minerals; and the growth of chemistry placed the whole subject on a broader footing. Brewster, Biot, and others directed attention to the optical properties of crystals. Since the beginning of the 19th century the science has made

rapid strides.

The examination of a mineral is conducted on the same lines as that of a chemical salt. Colour, specific gravity, lustre, hardness, malleability, electrical and magnetic properties, fusibility, and other physical characters are easily ascertained. Some of them are very distinctive: the colour of gold, the magnetic attraction of the lodestone, the specific gravity of the platinum metals, the lustre, hardness, and dispersion of the diamond, the malleability and ductility of copper or silver, enable us readily to identify these minerals. But many minerals vary greatly in colour, even in the same specimen: two minerals may be exactly alike in density, lustre, and hardness, and yet belong to entirely different species. As regards the chemistry of minerals, simple qualitative tests will indicate approximately the elements present. Most mincrals are insoluble in water; hence they are appropriately tested in the dry way by means of the blowpipe. Even quantitative examinations may be made by this means, though necessarily less exact than those in which larger quantities are analyzed in the ordinary way. But for the com-plete knowledge of a substance an ultimate and thoroughly exact analysis is essential. From this a formula is calculated, which represents the composition of the mineral in a state of ideal purity. Minerals often occur in aggregates globular, stalactitic, nodular, drusy, veined, mammillary, lamellar, concentric, and so on; but these are unessential characters. The crystalline symmetry and crystalline constants, on the other hand, are vital in the determination of the species. In the majority of crystallized minerals, the angles over the edges in which the faces meet one another are perfectly distinctive. From them the symmetry of the crystal and the class to which it belongs may be inferred; and in many cases no two minerals. even in the same sub-class, have precisely the same angles. Descriptive crystallography consequently occupies a large space in all scientific treatises on mineralogy. The optical properties largely depend on the crystalline

form; but the refractive indices, the strength of the double refraction, the optical sign (whether positive or negative), and the axial angles of biaxial crystals are hardly less distinctive than the geometrical constants, which determine the external form. So delicate are these optical tests that of late years it has been possible, by their means alone, to ascertain exactly what minerals are present in the most close-grained rocks when very thin transparent sections of them are magnified by the microscope.

Minerals admit of being ranged in families, the members of which have all a certain unity of character; chemically, crystallographically, and physically they tend to be alike, though each species preserves its individuality. Gold, silver, copper, mercury, and lead all occur native, and crystallize in the cubic or isometric system; yet their other properties are very dissimilar: they form the 'gold group.' Antimony, arsenic, and bismuth also occur native, but in rhombohedral crystals, and form a group of their own. Most minerals are not simple elements, but compounds, often with extremely complex formulæ. These compounds consist of one or more bases and acid radicles, and often it is the latter factor which seems to have the dominating influence in determining the character of the mineral. Thus, the carbonates of calcium, magnesium, iron, zinc, and manganese all form rhombohedral crystals which closely resemble one another. The carbonates of calcium, barium, strontium, and lead also belong to one group which crystallize in the rhombic system, and have a general similarity. It will be noticed that carbonate of calcium is a member of both these series, as it is dimorphous, and forms two distinct minerals having exactly the same composition, but different physical properties and crystalline symmetry. The two series above enumerated are, in fact, isodimorphous. ISOMORPHISM.) The members of each group may form compound crystals, having any relative proportion of the respective substances; only carbonate of calcium crystallizes in both systems as a pure salt, but small admixtures of all the others may enter into isomorphous mixtures with either of its forms, and it is assumed that this is in consequence of a latent dimorphism, each of them having really a rhombohedral and also a rhombic modification (dimorphism), while in either form they are all isomorphous (isodimorphism). These princi-ples extend through all the great mineral classes: for example, the sulphides, sulphates, phosphates,

oxides, and so forth, are grouped together in isomorphous series. The largest class of all—that of the silicates—and the most impor-tant, as to it belong the majority of the rock-forming minerals, has many natural families, such as the felspars, amphiboles, pyroxenes, and micas, which exhibit all the phenomena of isomorphism and dimorphism (or more generally polymorphism) in the fullest manner. These examples show that chemical composition is a very important factor in determining what characters a mineral will possess. Substances of similar composition may, prima facie, be expected to be so far alike as to belong to the same general class. But dimorphism proves that there must be some other equally important cause underlying the diversity of mineral forms. This is molecmineral forms. This is molecular structure. Much light is thrown on this subject by the study of organic compounds. Unfortunately, the more complex mineral molecules are very stable, difficult to convert from one form to another, and do not so readily lend themselves to experimental modification as do the carbon compounds. The analogies between the two, however, are very close. A very large number of minerals have already been artificially produced, either from solutions or from igneous fusion. The natural paragenesis of minerals shows that certain species tend to accompany one another in more or less regular succession. Thus, in saline deposits calcite, gypsum, rock salt, carnallite, epsomite are frequently found together. In basic rocks olivine, augite, and soda lime felspars prevail; in meteorites native iron, olivine, troilite, and so on. This part of min-eralogy links it with the cognate science of geology, as does the study of the life history of min-erals and the changes through which they pass. As they lie in the earth's crust they are exposed to the action of the water which circulates in the rocks. Many decompose, leaving pseudomorphs, which have the form of the original minerals, but consist only of secondary substances derived from their decay, or of freshmaterial introduced into the cavities which remained after the original minerals were removed in solution. Many minerals are great rarities. Several hundred species have been described, and new ones are constantly being added to the lists; but less than one hundred minerals are really common enough to be met with by the ordinary naturalist, geologist, or miner. Of these, a very small number—about thirty—occur practically everywhere,

as they are the constituents of

rocks, sand, and clays.
See F. Rutley's Mineralogy (1903); Nicol's *Mineralogy* (1873); Moses and Parson's Mineralogy (1900); H. A. Miers's Mineralogy (1902), a lucid and most scientific work; E. S. Dana's Text-book of

Further details, especially as regards the employment of the microscope to determine the minerals in rock sections, will be found in Hatch's Petrology (1892), Rutley's Study of Rocks (1870), Luquers's Minerals in Rock Scctions (1898), and very fully in



Types of Crystallization in Minerals. Gold: separate crystals and portion of 'Latrobe' nugget (gold group).
 Bismuth (anti-mougroup).
 Calcite (rhombohedral crystals).
 Aragonite (orthorhombic crystals).
 Almienite (sulphates).
 Albite (silicates).

Mineralogy (1898); H. Bauerman's Mineralogy (2 vols. 1884); Dana's System of Mineralogy (1892), the most comprehensive work in English; and Hintze's Mineralogie (in course of publication). Practical determinative mineralogy is treated of in the standard work of Brush and Penfield (1896), also by Weisbach and Frazer.

Rosenbusch-Iddings's Rock-mak-

ing Minerals (1888).
Mineral Oil. See Petroleum.

Minerals, of the United Kingdom. See Mining.

Mineral Waters generally contain an excess of salts or of other mineral constituents de-rived from the soil through which they flow; but the term

is sometimes applied to comparatively pure springs which have acquired a medicinal reputation from their thermal qualities. Hydrotherapeutics has already been dealt with in a separate article. It must always be borne in mind that a course of mineral waters involves change of environment, of diet, and of mode of life, and that these changes contribute largely to the cure for which the water often gets the sole credit. Whether used for bathing or for drinking purposes, mineral waters may be classified as indifferent, earthy, salt, sulphurous, iron, alkaline, purgative, or acidulated. Of these the indifferent are chiefly used as baths, and depend upon their thermal qualities for their therapeutic value. They occur most frequently in volcanic regions, and generally at a high altitude -e.g. at Buxton, Wildbad, Ragatz, and Pfeffers. Earthy mineral waters usually contain sulphate or carbonate of calci-um or of magnesium. They are generally found at high alti-tudes; but Bath is an exception. The water is usually hot, and is imbibed. Baden, Bath, and Contréxéville are the best known springs of this type. Salt waters have for their chief ingredient sodium chloride or common salt, in combination with iodine, bromine, and lithium, and with other salts. The weaker waters are used for drinking purposes, the stronger for baths. Kissingen, Homburg, Kreuznach, and Wiesbaden rank amongst the weaker waters; while among the stronger are sea water and the springs of Saratoga, Nauheim, and Droit-wich. Sulphurous waters owe their characteristic odour to the presence of hydrogen sulphide. but they generally contain other sulphides as well as sulphates. They are found at Harrogate, Strathpeffer, Aix-la-Chapelle, Baden, and Aix-les-Bains. Iron salts are present in the waters of Spa. Pyrmont, St. Moritz, Tunbridge Wells, and Hom-burg; but in all cases it is in association with other mineral constituents. Alkaline waters are generally rich in sodium bi-carbonate. Vichy, Ems, Ischia, Marienbad, Franzensbad, and Carlsbad have springs of this nature. Purgative waters are almost invariably highly charged with sulphates, and can very easily be simulated in the laboratory. Hunyadi, Ofen (Buda), Friedrichshall, and Kissingen have all springs of this type. Acidulated waters contain, as a rule, a large amount of carbon dioxide, but otherwise are only slightly mineralized. They are largely used as table waters and as aids to digestion. Of this

class Apollinaris, Roisdorf, and St. Galmier are in most common use. In certain springs, such as those of Baden-Baden, Royat, and Plombières, an exceedingly small proportion of arsenic has been found, and it has been claimed that the arsenic is the therapeutic agent in such waters. Similarly lithium exists in infinitesimal quantities in the waters of Baden-Baden, Royat, and Saratoga; but it is doubtful whether in either case the amount is sufficient to have either a beneficial or a deleterious effect. More recently a trace of radium has been found in the waters of Bath, and it is rather curious that for many years before the discovery of radium French writers attributed to mineral waters a peculiar efficacy inexplicable on such chemical or thermal principles as were then known.

The principal ailments likely to benefit by a course of mineral waters are those of a gouty or rheumatic type, more especially in patients whose mode of life has overtaxed the digestive organs. Dyspepsia, hepatic, and urinary troubles are favourably affected not only by the waters, but by the regimen of the health resort. Many patients with skin diseases also derive benefit from purgative and from sulphurous waters. Anæmia naturally improves under a course of iron and of purgatives, while diabetics and the obese also get relief from hydrotherapeutic treatment.

Minerva, an ancient Roman goddess, identified with the Greek Athena. She was the goddess of wisdom, and of arts and trades; and, from another point of view, of war in its scientific aspect. Accordingly she is often represented in armour, and frequently the spoils of war were dedicated to her. The invention of wind instruments, the use of which was very important in religious ceremonies, was ascribed to her. Her festival at Rome lasted from the 19th to the 23rd of March.

Minerva Press, a printing establishment in Leadenhall Street, London, which was noted in the 18th century for the publication of trashy sentimental novels, with complicated plots. They had a large circulation.

Minervino Murge (Lucus Minervæ), walled tn., Apulia, Italy, 43 m. w. of Bari; produces fruit and vegetables. Pop. (1901) 17.385.

Mines, NAVAL. See SUBMARINE

Minghetti, Marco (1818-86). Italian statesman, who succeeded Cavour in the administration and carried on his ideas, was born at Bologna. He entered the service of Pope Pius IX. in 1848, and remained one of his ministers

during the short period of the Pope's reforming zeal; but when the Pope yielded to the pressure of Austria and became reactionary, Minghetti transferred his services to Sardinia. He served with distinction in the Lombard campaign, and after the defeat at Novara (1849) lived for some years quietly in Milan. From 1859 he served under Cavour as secretary of state for foreign affairs, and in 1864 concluded with Napoleon III. the September convention, which seemed to place an obstacle in the way of the completion of Italian unity. But the surrender at Sedan gave Minghetti an opportunity, and Rome became the capital of united Italy. From 1873 to 1876 he was prime minister, and his skill and training in finance enabled him to establish an equilibrium between receipts and expenditure. His chief writings are on politics and economics— the relation of church and state having naturally great attraction for his mind. See his I Mici Ricordi (1888), and Magni's Marco Minghetti, Uomo di Stato (1894).

Mingrelia (anc. Colchis), a region now included in the Russian gov. of Kutais, but until 1414 a vassal state of Georgia, and subsequently independent, though tributary to Turkey and Persia. It passed under Russian control in 1803, but was not Russified until 1867. The Mingrelians, a branch of the Georgians, but with a language of considerable variation from that of Georgia, form the bulk of the population, which numbered (1897) 229,200.

Minho, or Mino. (1.) Chief river of Galicia, Spain, flows s. through Lugo and s.w. through Orense, into the Atlantic, forming at its wide estuary part of the boundary between Spain and Portugal. Its length is 175 m. For the last 25 m. of its course it is navigable for small vessels. (2.) Province of Portugal. See Entre Doung E Minho.

Miniature-painting is the art of executing pictures on a very small scale; and the workmanship is usually either so dainty or so precise in character that its qualities can be best appreciated when the 'miniature' is examined closely or held in the hand. In a more exclusive sense a miniature is a small portrait. The genesis of the miniature portrait or portrait miniature is to be found in the art of the illuminator as far back as the 18th Egyptian dynasty; and it formed a frequent and important element in illuminated missals as long as illumination was a living art. Properly speaking, however, a miniature is an independent work, with no raison d'être but itself, and in that sense Hans Holbein

was probably the earliest to practise the art. He was fol-lowed in England, where miniatures soon came into special favour, by other miniaturists, of whom Nicholas Hilliard and Isaac Oliver are the most celebrated of his immediate successors, while Samuel Cooper occupies the commanding place in the middle of the 17th century. The principal part of these men's work was in water colour, but oils were also used, and a little later miniatures drawn in 'plumbago' or lead-pencil had a certain vogue. Towards the end of the 17th century also ivory was introduced for water-colour, vellum and card having been used previously. In the earlier part of the ously. In the earlier part of the following century, Lawrence Crosse was the only fine miniaturist at work, but further on Richard Crosse, Richard Cosway, John Smart, Andrew Plimer, Henry Edridge, and others produced many dainty miniatures. The early 19th century also had a number of fine workers in miniature—c.g. Andrew Robin ministure—e.g. Andrew Robertson, A. E. Chalon, and Sir W. Ross. In France during the 16th century the Clouets produced many fine portraits and drawings on a scale somewhat larger than miniature, and a few true miniatures, including the Mary Stuart in oil on metal, in the Windsor Collection; but during the next hundred years and more, French miniatures, except in the form of enamels by Jean Petitot, who carried this type to a perfection never surpassed, and his followers, are few and un-important. In 1720, however, Rosalba Carriera, a celebrated Italian lady miniaturist, visited Paris, and greatly stimulated the native school. Many miniature pictures were executed in gou-ache by artists such as Boucher during the period of Louis xv. and Louis XVI., and enamel pictures were much used to embellish snuff and puff boxes and such like; but in portrait miniature the most important work was done by P. A. Hall, by J. B. Isabey (who was associated with Napoleon's court), and by Aubrey and Augustin. The invention of photography virtually killed miniature art. See *Illust. Cat.* of Burlington Arts Club Exhibition (1889), G. C. Williamson's History of Portrait Miniatures (1904), and J. J. Foster's Miniature Painters, British and Foreign (1903).

Minié, CLAUDE ÉTIENNE (1814-79), inventor of the Minié rifle, born at Paris. He served in the army in Africa, retiring in 1858. He invented the rifle and bullet bearing his name (1849), and directed the small-arms factory and the school of musketry at Cairo (1858).

Minich, prov. of Upper Egypt, traversed by the Nile. Area, 772 sq. m. Pop. (1897) 548,632. The capital Minich manufactures cotton and earthenware.

Mining. The chief difference between metalliferous mining and coal-mining lies in the method of winning and working the mineral. This is due to the mode of occurrence, theores of such metals as tin, copper, and lead being usually found in lodes, which are simply cracks or fissures in the earth's crust in which the ore and vein stuff has been deposited. These lodes or veins are usually

wedged across the vein as the stope gets higher. The ventilation of metalliferous mines does not present the difficulties which the colliery manager has to contend with, owing to the absence of fire-damp: the gas usually met with in a metal mine is carbon dioxide or black damp. Natural ventilation is often sufficient, and naked lights are invariably used.

Alum clay is worked at Ulster in Ireland. From it is produced alumina, and from this is got aluminium. Alum shale is obtained in Yorkshire. It is found in the Upper Carboniferous rocks.

General Summary of the Mineral Produce of the United Kingdom for the Year 1904.

1	in Tons,	and Quarries.
Alum Clay (Bauxite)	6,128	£1,516
Alum Shale	6,532	980
Arsenical Pyrites	46	151
Arsenic	976	5,719
Barytes	26,327	24,673
Bog Ore	4,543	1,136
Chalk	4,438,728	181,057
Chert and Flint	65.256	14,697
Clay and Shale	15,948,915	1,772,020
('oal	232,428,272	53,851,784
('opper Ore	5,276	14,172
Fluor Spar	18,160	15,464
Gold Ore	23,203	68,576
Gravel and Sand	2,239,593	166,189
Gypsum	234,005	72,868
Igneous Rocks	5,988,821	1,351,139
Iron Ore	13,774,282	3,125,814
Iron Pyrites	10,287	5,300
Lead Ore	26,374	206,238
Limestone (other than Chalk)	12,043,135	1,369,610
Manganese Ore	8,756	4,370
Mica	7,140	2,996
Ochre, Umber, etc	16,050	18,242
Oil Shale	2,333,062	554,346
Oil Shale	58	87
Salt	1,891,633	596,785
Sandstone	5,3 06,363	1,717,970
Silver Ore	35	1,782
Slate	563,170	1,678,726
Strontium Sulphate	18,169	17,260
Tin Ore (dressed)	6,742	479,633
Wolfram	161	14,369
Zinc Ore	27,655	137,012

of great inclination, nearly approaching the vertical, and vary in thickness from nothing to several feet. The shaft by which the mineral is won usually follows the inclination of the vein; at regular intervals, from 60 ft. to 100 ft. apart, levels are driven from the shaft into the vein on each side, these levels being connected by winzes or cross cuts for the purposes of ventilation. From the levels excavations are made in those parts of the vein which seem most profitable; these are generally made upwards, and the operation is called 'stoping,' the workmen standing on timbers

in close proximity to the Stanley Main scam of coal. Antimony ore has not been worked in the United Kingdom since 1892. It is found in veins in Scotland and Cornwall. Arsenical pyrites is found in Cornwall and Devon When refined it yields white arsenic (arsenious oxide). Arsenic is found among tin and copper mines in Cornwall and Devon. Barytes is found in Northumberland, Shropshire, and Ireland. Bog ore is worked in Ireland. It is used in the purification of gas. Chalk is found in Kent, and is worked either by mines or open quarries, chiefly the latter. It is

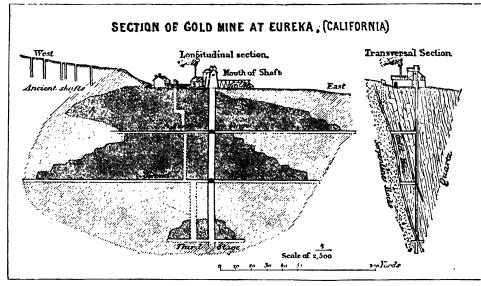
used in the manufacture of Portland cement. Chert and fint are found in Derbyshire and Flintshire, and used in the manufacture of china. Cluy is found very largely in the Coal Measures, also in the Permian and Triassic. China clay is found in Cornwall and Devon. Fuller's earth is found in Somerset and Surrey. Cobalt ore is found in small quantities in Flintshire, but has not been worked since 1890. Copper ore is found chiefly in Cornwall and Devon. The production is steadily decreasing. Fluor spar is found in Derbyshire and also in Durham. It is used for making ornaments, and as a flux. Gold ore is found in Merionethshire. Gravel and sand are found practically

The output in the United Kingdom is decreasing. Iron pyrites is used in the production of sulphur. It is found chiefly in Derbyshire and Warwickshire in England, and Wicklow in Ireland. Jet is found chiefly in Yorkshire. Lead ore is worked chiefly in Flintshire. It occurs as galena. The quantity of ore produced is less than half of the quantity produced in 1883. Limestone is found throughout the United Kingdom, particularly in Ireland. Manyanese ore is found in Derbyshire and Merionethshire. Mica is obtained from china clay. Nickel ore was formerly worked in Kirkcudbrightshire. Ochre and umber are found chiefly in Somersetshire in England, Wicklow in Ireland, and

the largest tin mine being the Dolcoath mine. The high price of the metal has led to a revival of tin-mining there. Uranium ore is found in Cornwall. Wolfram is found associated with tin ore in Cornwall. Zinc ore occurs as blende. It is found principally in Cumberland, Wales, and the Isle of Man. For coal, see COAL FIELDS and COAL MEASURES; for particulars with respect to coalmining, see COAL-MINING. For mineral productions in foreign countries, see under the various states, and also under COAL, COPPER, GOLD, etc.

Mining, MILITARY. In the

Mining, MILITARY. In the closing stages of a siege it frequently happens that the besieger has to carry on his advance underground, either because the fire of



Example of a metalliferous Mine.

all over the United Kingdom, Kent in England, Lanark in Scotland being the chief producers. Gypsum is principally found in Cumberland, Nottinghamshire, Staffordshire, and Sussex. Igneous rocks include granite, basalt, and so forth, the principal uses being for road-making. They are found chiefly in Leicestershire and Carnarvonshire. Iron ore is found principally in Cleveland, Yorkshire, Lincolnshire, Northamptonshire, and Leicestershire in England, Glamorganshire in Wales, and Ayrshire, Lanarkshire, and Renfrewshire in Scotland, and Antrim in Ireland. The Cleveland ore is worked from underground mines. The ore worked in Scotland is chiefly black-band ironstone.

Anglesey in Wales. Oil shale is found in N. Staffordshire, Flintshire, and very largely in Linlthgowshire. Phosphate of calcium is found in Bedfordshire and Cambridgeshire. Salt is principally produced from brine and is found chiefly in Cheshire. Rock-salt is worked in Cheshire, Lancashire, and Antrim in Ireland, to a small extent. Sandstone is worked chiefly in Lancashire and Yorkshire in England, Glamorganshire in Wales. Dumfries in Scotland. Silver is found associated with lead. Slate is principally found in N. Wales, at the Penrhyn and at the Dinorwic quarries. Strontium sulphate is found in Gloucestershire and Somersetshire. Tin ore is principally obtained from Cornwall,

the fortress is still unsubdued, or because there is a fear that further advance will be checked by means of counter-mines. The object of the besieger is to get underground, by means of vertical shafts or inclined galleries, to a depth equal to that at which he estimates the counter-mines to be placed. Galleries are then pushed forward with adequate intervals side by side until the counter-mine galleries are believed to be within reach. The heads of the galleries are then prepared with overcharged mines which are simultaneously fired. The result should be the destruction of the enemy's nearest counter-mines, and the creation on the surface of the ground of a series of craters which afford

cover, and which should at once be occupied and connected up with the nearest trenches. From the lodgments in the craters the besieger again continues his advance by shafts and galleries until he eventually reaches the counterscarp of the fort. As military mining is only carried out in soft soil, the shafts and galleries must be lined with wooden cases or wooden sheeting. The charges used are formed of black-grained gunpowder, as it gives less poisonous fumes than ordinary high explosives. After placing a charge the gallery is choked up or tamped in the vicinity, and explosion at the right moment is ensured by an electric current.

Mining Engineers, Institute OF. See SOCIETIES AND INSTITU-TIONS.

Minister. See Cabinet. Minium. See LEAD, RED.



Mink.

Mink (Mustela vison), an American animal of the weasel family, of aquatic habits. The fur is usually of a dark-brown colour. The food consists chiefly of fish and other aquatic creatures, but the mink also at times attacks poultry. It has a very unplea-sant smell. It is readily tamed when taken young, and is often bred in captivity in America. Very nearly allied is the marshotter, or European mink, found in Russia and E. Europe, and sometimes regarded as merely a variety of *M. vison*. In E. Asia there occurs the Siberian mink (M. siberica), nearly related to

the pole-cat.
Minneapolis, city, Minnesota, U.S.A., and co. seat of Hennepin co., on both banks of Mississippi, at Falls of St. Anthony, 10 m. N.W. of St. Paul. The University of Minnesota, a state institution founded in 1868, is located here. Minnehaha Park (133 ac.) contains the falls immortalized by Longfellow's Hiawatha. Minneapolis produces more than twofifths of the manufactures of the state, the principal being flour mills and saw and planing mills, with manufacture of machinery, iron-founding, and brew-ing. Pop. (1900) 202,718. Minnesingers, German lyric

poets of the 12th and 13th cen-

turies. An essential outgrowth of the courtly chivalry of the age, many of the minnesingers were men of noble descent. These minstrel poets led a wandering life, going from one court or nobleman's mansion to the other, expecting reward for the enter-tainment they supplied. Their poetry was by themselves called 'courtly song' (hößliches Gesang). Among the principal minneringers were Walther von der Vogelweide, Wolfram von Eschenbach, Heinrich von Ofterdingen, Otto von Botenlaube, Hartmann von der Aue, Gottfried von Strassburg,

Minnesota. (1.) Northern central state of U.S.A., with an area of 83,365 sq. m. It was organized as a territory in 1849, and admitted as a state in 1858. The surface presents little relief, except the hills formed by the deposition and erosion of the Laurentian glacier, which left its marks also in numberless lakes and marshes. Lake Itasca, the source of the Mississippi, is in the N. part of the state, a region once covered with pine forests. The capital is St. Paul, on the Mississippi, and adjoining it is the largest city, Minneapolis.



Neidhart von Reuenthal, and Ulrich von Lichtenstein. Their poems were mostly composed in the Swabian dialect of Middle High German. A collected edition, Minnesinger, was edited by Von der Hagen (5 vols. 1838-56), and a selection by K. Bartsch, Deutsche Liederdichter des 12 bis 14 Jahrhunderts (3rd ed. 1893). There are versions in Modern High German by K. Simrock (1857) and Storck (1872). See Lyon's Minne und Meister-sang (1882), Grimme's Geschichte der Minnesinger (1897), and A. Schultz's Das höfische Leben zur Zeit der Minnesinger (ed. 1889).

Agriculture is of the first importance, especially in the south. The wheat crop is commonly larger than that of any other state in the union. The live state in the union. The live stock interests are important. The leading products of manufacture are flour-milling and the sawing of lumber, these forming nearly half the manufactured product of the state. Butter and cheese and packed meats are also large items. The chief mineral product is iron ore, found in the N.E. Pop. (1900) 1,751,394, of whom 53'2 per cent. were males and 46'8 per cent. females. (2.) River of above state, a right-hand branch of Mississippi. It rises in Big Stone Lake, on the boundary between Minnesota and S. Dakota; thence it flows s.E., and finally N. to its junction with the Mississippi at Minneapolis. The drainage area is 16,000 sq. m.; its length is 450 m.

Minnow (Leuciscus phoxinus), one of the 'white-fish,' widely distributed throughout fresh water in Europe, and of not a little importance as food for some of the larger fresh-water fish. It may reach a length of seven inches, but is usually much smaller. From its near allies, roach, dace, and rudd, it differs in the fact that the lateral line is incomplete, and in its small size. Similar species of the same genus are called minnow in the United States, but the Americans also apply the name to members of other related genera. Minnows preserved in a solution of formaldehyde are much used as artificial bait in angling.



Minnow.

Minor, in Scots law, denotes in a general sense any person under the age of twenty-one years. In a stricter sense the term means a person between pupillarity and majority: in the case of a female. between twelve and twenty-one years; and in the case of a male, between fourteen and twenty-one years. The law of Scotland considers a minor (except in a few cases) capable of managing his own affairs, and his deeds are as valid as those of a major, except that if he has curators their consent is necessary, and in any case they may be reduced on the ground of minority and lesion within four years after majority.

Minor, in music. A minor tone is a comma less than a major tone. Minor seconds, thirds, sixths, and sevenths are a semitone less than these intervals in their major form. The third note in an as-cending minor scale is at the interval of a minor third from its

Minorca (Sp. Menorca), the second largest of the Balearic Isles, in the Mediterranean, 25 m. N.E. of Majorca, in 40° N. and 4° E. The surface is hilly and the pastures good, cattle and horse breeding being the principal industry. The climate is dry and relatively cold. Mahon (the capital) has one of the best ports in Europe. The island is the seat of a bishopric (Ciudadela). Minorca was a British possession from 1711 to 1756, when the Duc de

Richelieu captured it from Admiral Byng. It was again ceded to England in 1763, and finally captured by the French and Spanish in 1782. The island is very rich in Celtiberian remains, and contains a number of megalithic monuments called talayots.

293 sq. m. Pop. (1900) 37,512.

Minorites. See Franciscans.

Minority. See Minor.

Minos, in ancient Greek legend, two kings of Crete. The first was the son of Zeus and Europa, brother of Rhadamanthus, king and legislator of Crete, and after his death one of the judges of the dead in the lower world. The second was the grandson of the above; his wife was Pasiphaë, and among his children were Deucalion, Androgeos, and Ariadne. (See MINOTAUR.) Less mythical accounts represent him as uniting the whole of Crete under his monarchy, and as possessing a great naval power by which he ruled most of the Ægean. These accounts are confirmed by the recent excavations at Cnossus in Crete, the legendary capital of Minos, the extent and intricacy of whose palace probably gave rise to the story of the famous labyrinth.

Minot, Laurence (?1300-?1352), English lyric poet, born in the N.E. Midlands. He was author of eleven poems in the North-umbrian dialect celebrating Edward III.'s victories over France and Scotland (1333-52). Poems of Laurence Minot (ed. Hall, 1887).

Minotaur, a British first-class armoured cruiser, 14,600 tons, launched at Devonport in 1906.

Minotaur, in ancient Greek legend, a monster with a man's body and a bull's head, the offspring of Pasiphaë, Minos's wife, and a bull. Minos confined him in the Labyrinth, and exposed to him the Athenian youths and maidens who were sent to him as tribute by the Athenians, until Theseus, who voluntarily was included in their number, killed the monster, and by the aid of Ariadne, who gave him a clue of thread, escaped from the Labyrinth.

Min, riv., China, in prov. Fu-kien, drains about three-fourths of prov.; about 300 m. long; accessible by steamers to Pagoda Anchorage, 12 m. below Foochau, and navigable by boats in most of its course. In it, near Foochau, the Chinese fleet was destroyed by the French in August 1884.

Minsk. (1.) Government, W. Russia, forming part of old White Russia and afterwards of Lith-uania. Area 35,293 sq. m. It consists of—(1) a smaller and more open country, traversed by hills that form the watershed (1,200 ft.)

between the Baltic and Black Sea basins; and (2) a larger, flatter, and more wooded country, with extensive marshes. gov. belongs to the basins of the Nyemen, W. Dwina, and Dnieper. This last forms the E. frontier for about 150 m. Fisheries are important. Among the industrial establishments are distilleries, breweries, flour mills, oil works cloth, match, soap, tobacco, and candle factories, brickworks, potteries, sawmills and tanneries, iron foundries and glass works. Of the population (1897), 2,156,123, 69 per cent. are White Russians, 11 per cent. Poles, 10 per cent. Jews, the remainder mainly Lithuanians, Little Russians, and Tartars. (2.) Town, W. Russia, cap. of gov. of same name, 450 m. s.s.w. of St. Petersburg. It is the seat of Orthodox and Roman Catholic bishops, and has cathedrals of Orthodox (Russian) and Roman Catholic communions. Soap, tobacco, matches, woollen cloth, hats, and leather are manufactured, and there are breweries, distilleries, sawmills, iron foundries, and tile works. Like many other Russian towns, Minsk suffered during the outbreaks of 1905-6. Pop. (1897) 91,494.

Minster, originally the church of a monastery; the name is frequently given to cathedral churches, e.g. York Minster. See

CATHEDRAL.

Minster in Sheppey, vil., Kent, England, 3 m. E.S.E. of Sheerness station. A 7th-century convent was destroyed by the Danes, and refounded about 1130 by the archbishop of Canterbury for Benedictine nuns. The church of St. Mary, formerly attached to this abbey, preserves traces of Saxon architecture. Area (par.) 7,033 ac. Pop. (1901) 1,306. Minster in Thanet, vil., N.E.

Kent, 4 m. N.W. of Ramsgate. A convent founded here in the time of Egbert was destroyed by the Danes early in the 11th century. About half a mile s.E. of Minster is Ebbsfleet, one of the reputed landing-places of Hengist and

Horsa (449). Pop. (1901) 2,338.

Minstrel, a wandering singer, known variously as jongleur, minnesinger, or skald. Minstrelay has a double origin, in the song of Teutonic scopas or gleemen, the chanters of heroic lays, and in the varied arts of the mimes and other entertainers of the Roman empire. The minstrels led a vagrant life, and found a ready welcome alike in the baron's hall and the village street. Some of them, however, attached themselves to the household of a lord. In the 15th century they began also to form themselves into guilds for mutual aid and the defence of their privileges. During many cen-

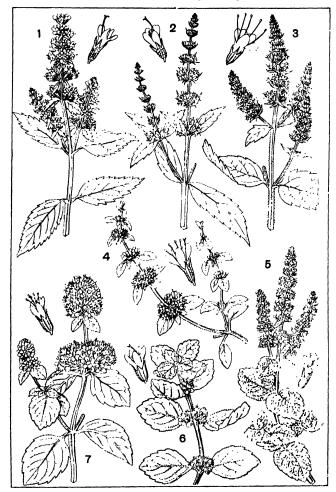
turies they had to reckon with the dislike of the church. But they found their way even into monasteries; and in the end a compromise was established. fact, minstrelsy had many grades. At one end of the scale there were tumblers, dancers, and buffoons, many of whose performances were very gross; at the other, courtly musicians and singers of the mediæval epics and romances. It is to the minstrels that most of mediæval literature, outside the mediæval interaction, clisterature religious and learned literature of the cloister, is due. The breakup of minstrelsy is due, first to the establishment in 11th century Provence of the distinction between the troubadour and the jongleur, the composer and the executant of poetry; and sec-ondly, to the invention of print-ing, as a result of which books supplanted the minstrels as distributing agents of literature. See J. Ritson's Ancient Songs and Ballads (ed. W. C. Hazlitt, 1877); W. Chappell's Old English Popular Music (ed. H. E. Wooldridge, 1893); J. J. Jusserand's English Wayfaring Life (1892); and E. K. Chambers's Mediæval Stage (1903).

Mint, or MENTHA, a genus of labiate plants with many-flowered whorls of flowers with nearly regular corollas. They are very widely diffused over temperate regions, and several species are natives of Britain. M. Pulegium is the pennyroyal. M. silvestris, the so-called horse-mint, has strongly-scented, downy, ovate leaves, and bears slender spikes of lilac flowers in autumn. M. rotundifolia, the round-leaved mint, can be distinguished from other species by its very wrinkled leaves, woolly beneath. M. aquatica, the hairy mint, is the commonest British species. It is found by the sides of rivers and in marshy land. It has egg-shaped, downy leaves, and whorls of lilac flowers. M. arvensis, the common corn-mint, has downy leaves, and dense, distant whorls of small lilac flowers in autumn. More important, however, are the spearmint and peppermint of cultivation, M. viridis and M. piperita. (See PEPPERMINT.) Spearmint is grown for the use of its leaves in the preparation of sauces and other culinary processes.

Mint, an establishment where money is coined by public authority under special rules and regulations. The privilege of coining has in all ages and countries been a sovereign right, and has rarely been delegated to any subject. The Royal Mint, on Tower Hill, London, was erected in 1810, and is controlled by a master (the Chancellor of the Exchequer) and a deputymaster. The metal, gold, silver, or bronze, is first cast into ingots.

special metallic moulds being used. The ingots are rolled into sheets in a rolling mill. The sheets are drawn to gauge thickness in a drawing machine, and then passed to the punchingmachine, which cuts out discs of the diameter of the coin to be made. The discs are then rolled between revolving dies, and leave

coin, are made to approach until they clasp the disc, round which the ring die is at the same time placed. The pressure of the top and bottom dies causes the disc to swell outwards into the serrated ring, and so form the mill. The coins are stamped at the rate of about 120 per minute, though as many as 200 per minute are dealt

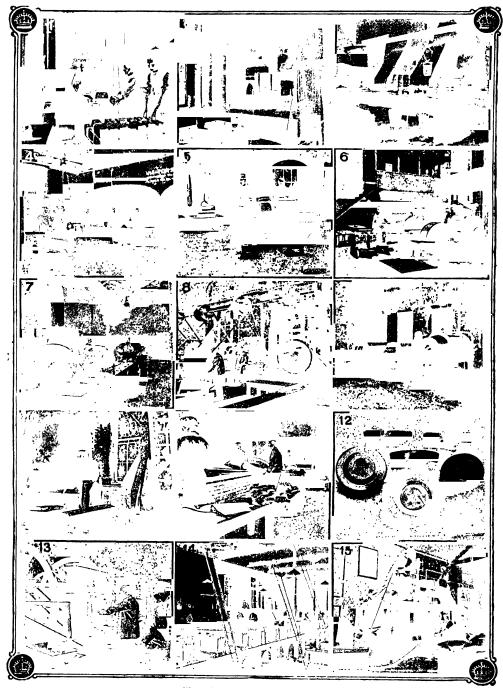


Species of Mint.

1. Mentha piperita. 2. M. viridis. 3. M. silvestris. 4. M. pulegium. 5. M. rotundifolium. 6. M. arvensis. 7. M. aquatica.

the machine of a gauge diameter, and with the edge smooth. The next operation is the stamping of the disc on both sides, and serrating or milling the edge. This is accomplished in the coining press at one operation by means of three dies. The top and bottom dies, bearing the devices and inscription to be stamped on the

with by some machines. Each coin is inspected for flaws or defects after leaving the press. The final operation is weighing, as the coin must be of legal weight. This is effected by automatic weighing machines, by means of which the coins are also automatically sorted into those too heavy, too light, and of the cor-



Views in the Royal Mint, London.

Weighing and checking silver ingots.
 Assay turnaces.
 The silver melting house.
 The gold melting house.
 Casting silver bars.
 The rolling room.
 The drag bench.
 The cutting room: punching out blanks.
 Annealing the blanks.
 Washing.
 Drying and polishing: 12. Matrix; punch, and finished die. showing the segmental collar above.
 The colning process.
 Automatic weighing machines.

rect weight. The total number of pieces, imperial and colonial, struck at the Royal Mint during 1905 was 95,787,730—gold coinage, £6,500,000; silver, £510,491; bronze, £100,325.

Minto, Sir Gilbert Elliot, First Earl (1751-1814), governorgeneral of India, was born at Edinburgh. He was viceroy of Corsica (1794 6), and from July 1799 to December 1891 minister at Vienna. Appointed governorgeneral of India in 1897, he displayed conspicuous resource, tact, and vigour, especially excelling in successful frontier treaties. Having captured Mauritius and Bourbon, the Spice Islands, and Java, he was created, in February 1813, Earl of Minto and Viscount Melgund. See Life and Letters of Earl Minto, by the Countess of Minto (4 vols. 1874-80).

Minto, GILBERT JOHN MURRAY KYNYNMOND ELLIOT, FOURTH EARL OF (1847). In 1877 he was attached to the Turkish army during the Russo-Turkish war. He served in the Afghan war of 1879, and as a volunteer in the Egyptian campaign of 1882. He was military secretary to the Marquis of Lansdowne (governor-general of Canada from 1885 to 1885), and in 1885 he was appointed chief of staff to General Middleton during the N.W. Canadian rebellion. He was governor-general of Canada from 1898 to 1904. In 1905 he became viceroy of India.

Minto, WILLIAM (1845-93), Scottish man of letters, was born at Alford, Aberdeenshire. He was assistant professor of logic and English literature at Aberdeen from 1867 to 1873, and after a journalistic career in London he returned to Aberdeen as professor in 1880. He wrote A Manual of English Prose Literature (1872), Characteristics of English Poets (1874), The Crack of Doom (1886), The Mediation of Ralph Hardelot (1888), English Literature under the Georges (1894), and edited an edition of Scott's works.

Minucius Felix, Marcus, a Roman lawyer, who lived probably about 230 A.D., and wrote a dialogue called Octavius, one of the earliest defences of ('hristianity (Eng. trans. in Ante-Nicene Fathers Series, vol. iv.). Minuet, a stately form of

Minuet, a stately form of dance, said to have originated in Poitou, France. Its music is usually written in a time. The name was also given to a movement, in the time and rhythm of the dance, which was frequently introduced by the early composers into suites and other instrumental compositions. Beethoven developed the minuet into the scherzo, under which name the movement holds an important position in symphonies and sonatas. The

name is also used as a title for individual compositions written in a particular style.

Minuluan, tn., Negros, Philippines, 5 m. N. of Bacolod. Pop.

(1901) 11,340.

Minuscules, modifications of the earlier letters that we now call capitals. Their name denotes their small size, and is opposed to the term majuscule, which includes capitals and uncials. The small letters on this page are the minuscules of the Latin alphabet. Before the invention of printing, book MSS. were written in a formal book hand, other documents generally in a more cursive business hand. Book Mss. were written at first in capitals, later in uncials, and finally in minuscule letters. But the use of minuscules in books does not seem to commence before the 7th and 8th centuries A.D. There were several distinctively national handwritings at that time. In the 9th century a new minuscule was formed, and was adopted throughout W. Europethe Caroline minuscule, originated in the school of Tours when Alcuin of York presided over it. In the 14th and 15th centurious this contraction of the 14th and 15th centurious this contraction. turies this minuscule assumed the heavy forms represented in black letter and German printing. In the 15th century, just before the invention of printing, fashion returned to an earlier type. This was imitated by Italian printers, and has become the ordinary type in France, Spain, Italy, and England. See E. M. Thompson's Handbook of Greek and Latin Palaography (2nd ed. 1894).

Minusinsk, tn., Yenesei gov., Siberia, about 180 m. s. of Achinsk, and at the head of steam navigation on the Yenesei. Pop.

(1897) 10,255.

Minute, a small portion—(1) of time, the sixtieth part of an hour, and comprehending sixty seconds; (2) of an arc, the sixtieth part of a degree (mark'), and consisting also of sixty seconds.

Minyæ, one of the tribes of original Pelasgic race in early Greece; they are said to have inhabited Thessaly, Bœotia, part of Messenia, Thera, and its colony Cyrene. In Bœotia, Orchomenus was their chief city; discoveries there show the identity of the Minyan civilization with that commonly called Mycenean.

Miocene, a geological epoch between the Eocene (and Oligocene) and the Pliocene period. Strata of this age are not known in Britain, but they cover extensive tracts in France, Spain, Belgium, Switzerland, Austria, and around the Mediterranean. They are mostly limestones, sand stones, and conglomerates, with lignites and plant-beds crowded with vegetable remains, indi-

cating a flora of more tropical character than now exists in the same latitudes. The most striking instance of this is afforded by the beds of Miocene coal which are found in the north of Greenland. The Miocene plains and forests were peopled by large mammals, including the Mastodon, Dinotherium, Anchitherium, and rhinoceros. More interest attaches, however, to the great physical developments characterized the Miocene period. The Alps, already founded, received their crowning uplift, and the earth movements connected with their elevation have left their marks in the tilted strata of the Isle of Wight and Hamp-shire basin, the Weald of Kent, the London syncline, and the ranges of the Chalk Downs.

Miquel, JOHANNES VON (1829-1901), German statesman, born at Neuenhaus, Hanover; entered the Hanoverian Parliament (1864); was burgomaster of Osnabrück (1865-70, 1876-80) and of Frankfort-on-the-Main (1880). In 1887 he entered the Reichstag, and (1890-1900) was Prussian

minister of finance.

Miquelon, Great and Little, islands off the s. coast of Newfoundland. With St. Pierre and Ile-aux-Chiens (total area, 93 sq. m.) it forms a French colony, ceded by France to Great Britain in 1713, but restored to France in 1816. The islands are barren and rocky, but an important centre of cod fisheries. Total trade, over £500,000 annually. The capital is St. Pierre. Pop. (1897) 6,352.

Mir. The, or COMMUNE, is a survival of several and restored.

survival of an old Aryan custom which at one time prevailed extensively throughout Europe. It exists at the present time among the Slavonic peoples—the Russians, the Croats, and the Serbs. The village lands belong to the village in common, and are assigned temporarily to the villagers according to their working power. The commune pays into the imperial treasury a fixed yearly sum according to the number of its peasants, and then arranges among its members how the land is to be distributed. In some communes the land is divided yearly, in others every two or three years. Sometimes many villages are grouped together in a commune, and then it is called in Russia a volost. The village has its 'parliament,' presided over by the village cider. The peasants exercise their votes, and women are allowed to vote with them. When the serfs were emancipated in 1861, the landlords received an indemnity, and the village lands were released from their seigniorial obligations.

Mira (= o Ceti), the first-known variable star, discovered by David

Fabricius (Aug. 13, 1596). Herschel saw it nearly as bright as Aldebaran in 1779; but it ordinarily fluctuates between about 3rd and 9th magnitudes in a cycle

averaging 331 days.

Mirabeau, André Boniface Riqueti, Vicomte De (1754-92), brother of the famous Mirabeau, known as Mirabeau Tonnerre, or Barrel Mirabeau, owing to the amount of liquid which he consumed. He fought in the American war, and holding strong aristocratic views, became one of the Right in the National or Constituent Assembly. After the death of his brother he joined the émigrés, a body of whom he headed when war broke out in 1792 between France and Austria. He met with a fatal accident at Freiburg in Breisgau. See E. Berger's Le Vicomte de Mirabrau (1904).

Mirabeau, GABRIEL HONORÉ RIQUETI, COMTE DE (1748-91), French statesman, was descended from a family of Provence, which claimed to be descended from a noble Florentine family, the Arighettis. Modern research has shown the claim to be ground-less. He was born at Bignon, near Nemours. A serious moral escapade at the age of seventeen led to his imprisonment in the He de Rhé; but he was released, and took part in the French expedition for the subjection of Corsica (1769). After he had wasted his own and his wife's fortunes, his father procured a lettre de cachet, that led to the imprisonment of the son in the Château d'If, and later at Pontarlier. There the young Mirabeau fascinated a Madame Sophie de Monnier, with whom he managed to elope, the pair making their way to Amsterdam. Mirabeau now did literary hackwork, until, at his father's instance, he was arrested, taken to France, and thrown into the Château de Vincennes. During his confinement there he studied hard, and wrote the famous Lettres de Vincennes. He was liberated at the intercession of his wife. After a visit to London, where he won the friendship of Romilly, and appreciated the benefits of parliamentary life, he undertook some secret political work for the French government at Berlin (1786-7)—an experience that led to the compilation of his most solid work, La Monar-chie Prussienne (1788).

At the outbreak of the French revolution Marseilles elected him to the States-general. Received at Versailles with every mark of distrust, he yet soon exerted his magnetic influence upon men. Louis XVI., Marie Antoinette, and the court looked on him as the most dangerous of the demagogues; but he took means, through his friend, the courtier

La Marck, to inform the king of his royalist sentiments. Nothing came of these overtures, mainly because the king suspected him of complicity in the events of October 5 and 6, when the Parisian rabble brought the king and queen to Paris. The National Assembly distrusted him fully as much, and on November 7 passed a decree forbidding any of its members to take office in the king's ministry, or even for six months after they should resign their membership. His overtures to Necker, the finance minister, and to Lafayette, commander of the National Guard of Paris, also came to naught, mainly because they feared his corruptibility. Nevertheless Mirabeau threw himself into the debates of the Assembly and of the Jacobin Club, where his speeches were of unequalled power; and with the aid of collaborators he kept in touch with the provinces and with foreign affairs. He proposed the confiscation of church lands, but disapproved of the heedless issues of assignats in connection with their sale. In May 1790 La Marck brought him again into touch with the king, and he began secretly to draw up notes for his advice. In return Louis XVI. promised to pay his debts (they amounted to £8,000), to pay him £240 a month, and £40,000 at the close of the Constituent Assembly, if he served him well. Mirabeau sought to keep for the king the right of declaring war and peace (in which he partly succeeded), and in every way to strengthen the monarchy on its new democratic basis. His bitter attacks on the church concerning the civil constitution of the clergy (July 1790) aroused Louis's distrust, and thenceforth he looked on him merely as a demagogue bought over. To Mirabeau's later plans Louis paid little heed. The great orator lost his hold on the Jacobin Club, and his triumphs in the Assembly were mainly rhetorical and evanescent. The publication of the Correspondance entre Mirabeau et Lamarck in 1851 first showed how completely Mirabeau had failed to stem the revolution. There are several editions of his speeches, from the Collection complète des Travaux de M. Mirabeau à l'Assemblée Nationale (1791-2) to the selection (in English) made by Mr. Morse Stephens in his Orators of the French Revolution (1892). The hest biographics are Dumont's Souvenirs sur Mirabeau (1832; Eng. trans. as The Great Frenchman and the Little Genevese, by Lady Seymour, 1904), Alfred Stern's Das Leben Mirabeaus (2 vols. 1889), Willert's Mirabeau (1898), and Warwick's Mirabeau and the French Revolution (1905).

Mirabeau, VICTOR RIQUETI, MARQUIS DE (1715-89), was born in the old Château de Mirabeau in Provence. He knew Montesquieu, and adopted the views of the physiocrats. His literary abilities were undoubted, but his family life was ruined by his caprices and brutality. His treatment of his famous son, Honoré, drove the latter into excesses, and in 1781 his wife obtained a decree of separation. He was the author of Ami des Hommes (1755) and La Philosophie Rurale (1763). See Loménic's Les Mirabeau (1889-91), and Willert's Mirabeau (1898).

Mirabilis, a genus of American herbaceous plants belonging to the order Nyctaginacea. The common marvel of Peru, M. julupa, is the species most frequently grown in Britain. It is a half-hardy Mexican plant, and its tubers should be taken up in late autumn, in the same way as those of the dahlia. It bears large, variously-coloured, sweet-secuted flowers in summer.

Miracle Play, a popular religious play in the middle ages; also, but incorrectly, called Mystery. Strictly the term is equivalent to a play on the subject of a miracle wrought by the Virgin, or St. Nicholas, or some other popular saint; but it is applied also to dialogues or plays on subjects drawn from the Old or New Testament narratives. Such dialogues first appear in the 10th century; but by the middle of the 12th the participants had become so numerous that it was difficult to accommodate them in the churches. They migrated to the churchyards and the marketplaces, and with the change a process of secularization set in. The subject-matter remained religious, but the performances came to be given in the vernacular instead of in Latin; and the performers were no longer priests, but laymen, often banded together in guilds. Side by side with the more primitive types there came into being long passion plays, dealing with the whole story of the passion and the resurrection, together with the missionary life of Christ; and long Christmas plays, in which the treatment of the nativity was prefaced by that of the Old Testament prophecies and types of the Redeemer, and of the fall which made the redemption necessary. Finally the two sections were united in great cosmical cycles, which extended from the creation to the last judgment. At the end of the 13th century Whitsuntide was the favourite time for such plays; but after the establishment of Corpus Christi day (the Thursday in Trinity week), in 1311, they were

frequently attached to this festival. In many English towns the plays became an important municipal affair. At Chester, York, Beverley, Newcastle, Nor-wich, Lincoln, Coventry, Worcester, and clsewhere, they were given annually by the various craft guilds.' It was very common for each craft to make itself responsible for a single scene of the play, and to perform it on a movable stage or 'pageant' at various stations in the streets of the city. No such annual craft plays were known in London; but here performances were given at irregular intervals by a guild of parish clerks in the fields near what thus came to be known as Clerkenwell. During the 15th century miracle plays were in their heyday; about the middle of the 16th they began to disap-The reformers thought pear. The reformers thought them profane, and the growth of the professional drama left them old-fashioned. Numerous texts of miracle plays are preserved. There are the craft plays of York, of Chester, and probably of Wakefield (the Townley plays). There are fragments of the Norwich, the Coventry, the Newcastle cycles, and of several others that cannot be identified. There is the Ludus Coventria, the locality of which is also uncertain, but which was probably given, the London plays, on a single stationary scaffold. There are also a few Cornish plays, of which the scene was doubtless a 'round' or amphitheatre, such as may still be seen at St. Just and at Ferranzabulo. See J. P. Collier's English Dramatic Poetry (1879); A. W. Ward's English Dramatic Literature (1899); A. W. Pollard's English Miracle Plays, Moralities, and Interludes (1890-8); K. L. Bates's English Religious Drama (1893); E. K. Chambers's Mediwood Stage (1993). Texts: York Plays, ed. L. T. Smith (1885); Chester Plays, ed. T. Wight (Shakespeare Society, 1843-47), ed. H. Deimling (part issued, E.E.T.S., 1892); Townley Plays, ed. Pollard and England (E.E.T.S., 1897); Ludus Goventrie, ed. J. O. Halliwell (Shakespeare Society, 1841); Digby Plays (mis-cellancous), ed. F. J. Furnivall (E.E.T.S., 1896). Specimens: A. W. Pollard (ut supra); J. M. Manly's Specimens of Pre-Shakespearean Drama (1897), vol. i.

Miracles. Theology, assuming that God is a free, absolute Spirit, whose activity is not exhausted in the laws of nature, and that the world has a spiritual end to which these laws are subservient, defines miracle as a breach of the continuity of nature as known to us, traceable to God, and designed by Him to meet some special exigency in the

process of revelation. The New Testament miracles are spoken of under three designations-dunamis, a 'mighty work;' teras, a marvel; and semeion, a 'sign: teras, however, is always associated with semeion (signs and won-ders, John 4:48). It is generally conceded that the New Testament miracles stand by themselves, differentiated alike from those of the Old Testament, of which we can hardly be said to possess contemporary evidence; and from the ecclesiastical miracles, which come from admittedly superstitious times. Heathen wonders need hardly be taken into con-Heathen wonders sideration at all. In virtue of their nature as signs, miracles require the background of an orderly natural process. But since the time of Christ the conception of natural law has become as rigid as may be; hence it is not merely a scientific axiom that miracles do not happen, but it is questioned by many serious minds whether they ever did happen. Hume, by his definition of miracle as a violation of the laws of nature, and his assertion that they are incredible, anticipated the standpoint of modern agnosticism; but he argued in racuo, so to speak, and professedly perhaps ironically, excluded perhaps ironically, excluded the Christian miracles from his strictures. The agnostic procedure is now rather to deny that any given miracle has sufficient evidence in its favour, and to maintain that any such would require more proof than an ordinary event; and Huxley has supplemented this by the assertion that if a miracle, such as the restoring to life of a dead man, were actually to take place, the phenomenon would simply become a problem for further scientific investigation; and if it stood the test, a search for some wider scientific law would at once be instituted. A similar point of view has been taken on the Christian side-for example, by the late Duke of Argyll, who believed that miracles may be explained as due to incidence of a wider or higher They would thus, being periodic, involve no breach of continuity, and would still be valid as signs. But this theory loses something in that it does not give due place to the free personal will of God. Dr. Mozley endeavoured to discredit the axiom of the continuity of natural law: but this only cuts the ground from under his own feet, because such continuity is a necessary condition of miracle. Some modern writers on the life of Jesus, again, while proceeding on the assumption that miracles do not happen, yet recognize that the evidence cannot be lightly ignored, and have tried to show how the reports of

His miracles arose. Thus Paulus saw in them but the misunderstanding and exaggeration of ordinary phenomena—for example, Jesus did not walk on the water, but on the shore near the sea. Strauss regarded the miracles as myths-i.e. as material representations of spiritual ideas, largely suggested by Old Testament stories. Such explanations, however, ingenious and sometimes suggestive as they are, strike the plain man as tours de force. The wonderful works of Jesus are so per-fectly consonant with His unique personality, so interwoven with His most characteristic discourses, and so free from all suspicion of being sporadic or isolated marvels, that we cannot remove them from the narrative without leaving Him too little significance to have such deeds attributed to Him. The evidence of any particular miracle may be easily oppugned, but the concentrated force of the whole presentation is not to be summarily diverted. Probably the surest line of defence is as follows:—Admit the divine regulation of the world by natural law, the spiritual nature of man, and his value to God; admit that in the exercise of his free will he has disturbed the balance of the moral universe by sin, and that God purposes to restore it; then there is no d priori improbability that God should supplement, or even in a manner reverse, the workings of natural law by a fresh revelation of His will and character. And if Jesus Christ be the bearer of this new revelation, may we not regard His miracles as the spontaneous, even natural, expressions of His personality? Miracles are thus anything but incredible to one who believes in the love of God, and in the fact of human sin. It is also to be remembered that such a renowned scientist as A. Russel Wallace accepts miracles as being in accordance with his view of the universe as essentially spiritual. See Trench's Notes on the Miracles (1886); Mozley's Bampton Lectures (1883); Bushnell's Nature and the Su-pernatural (1862); Bruce's Mi-raculous Element in the Gospels (1886).

Mirage, a delusive appearance due to the rays of light being successively bent in their passage through the air. This bending is occasioned by layers of air at different elevations having a varying density on account of the heat from the ground, which curves the light rays so that the tangent to the ray at the eye of the observer comes from below, and therefore the image seems as if it were below the ground. Sometimes inverted images of distant trees and ships are seen near the

horizon beneath the direct images. At other times, especially in hot countries, the ground is lost sight of beyond a certain distance from where the observer is standing, and he sees in its place what appears to be a sheet of water, either in a state of quiescence or in motion resembling waves. Objects at a distance, if sufficiently lofty to be seen above this apparent lake, are often observed beneath the objects themselves inverted as if by reflection in this imaginary water surface. Mirage is rarely seen in winter. The occurrence of the phenomenon in the Arctic regions is attributed by Captain Scoresby to 'the rapid evaporation which takes place in a hot sun from the surface of the sea, and the unequal density occasioned by partial condensations, when the moist air becomes chilled by passing over considerable surfaces of icc.' See Professor Everett, in Nature for Nov. 19 and 26, 1874.

Miraj, feudatory state, Deccan, India; area, 564 sq. m.; pop., about 125,000. The capital has the same name, and stands 70 m.

w. of Bijapur, near the river Krishna. Pop. (1901) 18,425. Miramichi, riv. (230 m. long), rises in w. of New Brunswick, and flows generally N.E. into Gulf of St. Lawrence. The upper reaches of the river are noted for their salmon and trout fishing. The port of Chatham stands at its mouth.

Miranda, state of Venezuela. formerly called Guzman Blanco. It extends from the coast inland to the Orinoco, and therefore includes hot coast, highlands, and llanos. Between the mountain ranges are some of the best coffeeproducing lands, the valley of the Tuy in particular. Area, 33,969 sq. m. Pop. 484,509. Miranda, Countess De. See

NILSSON, CHRISTINA.

Miranda, Francisco Antonio Gabriel (1756-1816), Spanish-American revolutionist, born at Santa Fé, New Granada. He equipped one ship (1806), and landing at Carácas, made an unsuccessful attempt to proclaim a Colombian republic. In 1810 he was more successful-Venezuela, New Granada, and Colombia being proclaimed republics. Internal dissensions, however, divided the revolutionists, and Miranda was defeated (1812). He died in prison at Cadiz.

Miranda, or Sá DE MIRANDA. FRANCISCO DE (1495-1558), Portuguese poet, born at Coimbra; was professor of law in the university there. He founded a school of pastoral poetry, his eclogues, sonnets, and dramas being after Italian models. His sonnets were the first written in Portuguese.

but many of his poems were in Spanish. His works were published in 1595 (new ed. 1885).

Mirandola, vil., prov. Emilia, Italy, 17 m. N.E. of Modena, has a cathedral and ducal palace.

Pop. (1901) 13,721.

Mirandola, GIOVANNI PICO, COUNT DELLA (1463-94), Italian humanist and philosopher, was born at Mirandola. Joining the Neo-Platonists at Florence (1484), he endeavoured to reconcile the systems of Aristotle and Plato, and employed Oriental lore in order to drive home his points. In 1486 he nailed up his famous nine hundred theses at Rome. Some of these were condemned as heretical by Innocent VIII. (1487). and Pico was persecuted by the Holy See till 1493, when Alex-ander VI. became reconciled to him. In the meantime he lived at Florence, in intercourse with Ficino, Poliziano, and the rest. The Latin Opera were published at Basel in 1572, together with those of his nephew, who bore the same name, and who wrote, inter alia, the life of his uncle. This latter was translated by Sir Thomas More, together with selected works by the older Pico (ed. J. M. Rigg for Tudor Library, 1890). See Italian biographics by Oreglia and Di Giovanni (1894), Calori-cesis, Malavasi, and Massetani (1897). Ficino, Poliziano, and the rest. Massetani (1897).

Mirbane Oil. See NITRO-BENZENE.

Mirbelia, a genus of Australian shrubs belonging to the order Leguminosæ. They are sometimes grown under glass in Britain.

Mircea, hospodar of Wala-chia, ruled from 1387 to 1418. He wrested the Dobrudja and Silistria from the Bulgarians, but was forced to surrender the right bank of the Danube to the Turkish sultan Bayazid. After the loss of the battle of Nicop-After olis (1396), he was compelled to do homage to the Turks, and to pay an annual tribute.

Mirfield, par. and tn., W. Riding, Yorkshire, England, on the Calder, 41 m. N.E. of Huddersfield; has manufactures of woollen cloth, cottons, carpets, and blankets, also malting and collieries. Pop. (1901) 11,346.

Mirgorod, tn., Poltava gov., S.W. Russia, 80 m. N.W. of Pol-tava city. It manufactures linseed oil and tiles. Pop. (1897) 10.023

Mirim ('little') Lagoa, coast lagoon, prov. Rio Grande do Sul. Brazil, connected with the larger Lagoa dos Patos by the Rio S. Gonçalo. It is 100 m. long, and from 5 to 25 m. wide.

Miropole, or MIROPOLYE, tn. Kursk gov., Central Russia, 16 m. s.s.e. of Suja. There are saltpetre and brick works. Pop. (1897) 10,896.

Mirror, a reflector, now generally of glass. Venice—i.e. Murano—was famous for its glass mirrors from the beginning of the 14th century, as Paris is to-day. It displayed a labyrinth of them at the exhibition



Ancient Greek Mirror, with figures of Hercules and Athena.

of 1900. Ancient mirrors were made of brass, bronze, silver, gold, steel, and various alloys.



Venetian Mirror, 16th century, in walnut and mother of pearl (S. Kensington Museum).

The Romans of the early empire also used obsidian, lapis specularis, and phengites (a whitish stone from Cappadocia); and Nero had one of emerald. From Sidon came the first glass mirrors. Corinth (400 B.C.) produced the best Greek, and Prænesto Roman

specimens. Metal mirrors were generally round, with a handle attached, which could be fixed in position or held by the hand. Of this shape were the Etruscan, Greek, and Celtic specimens. Mirrors were usually portable



Japanese Mirror, 19th century (S. Kensington Museum).

and personal belongings, and became furniture only in the 16th century. Divination mirrors are mentioned by Pausanias. Burning glasses were used by Archimedes (?) and by Proclus (514 A.D.). Buffon ignited wood with them 140 ft. away. Ochsen. augen (convex) were familiar in Germany in the middle ages. Magic mirrors of Japan (known since 9th century) are of bronze. with convex surface and inscribed back. They reflect on a white screen an image of the raised ornaments on the back. Mirrors are backed with a metallic covering; this is called 'silvering.' Previous to 1840 an amalgam of tin and mercury was used; now silver is used. The silvering is further protected by a coating of shellac and red paint. By using a curved glass instead of a flat one, the reflected image of the object will become distorted, a concave cylindrical mirror lengthening it at the expense of width, and a convex mirror producing the opposite effect. Etruskische Spirgel (new ed. 1884), by Gerhard ; Kleinere Kunst und Industric im Alterthum (1871), by Friederichs.

Mirza, a title used in two ways by the Persians. When prefixed to the surname, it is simply equivalent to 'Mr.'; but when affixed to the surname, it denotes a prince of the blood royal.

Mirzapur, munic. tn. and cap. of dist. of same name, United Provinces, India, on r. bk. of the Ganges, 30 m. w.s.w. of Benarcs, with manufactures of carpet and brassware. Its ghats and temples are specially noteworthy. Pop. (1901) 79,862. The district has an area of 5,223 sq. m. and a population (1901) of 1,082,430.

Misappropriation, the verting to one's own use or benefit, or to the use or benefit of some one else than the true owner, of property lawfully in one's possession, but entrusted to one for particular purposes. The word is not a legal term of art, but a popular general description of a number of fraudulent transactions in the nature of embezzlement.

Miscarriage. See ABORTION. Misdemeanour. See CRIME AND CRIMINAL LAW.

Miseno, cape, Italy, at w. extremity of Gulf of Naples, 9 m. s.w. of Naples. Augustus made the ancient city of Misenum, situated here, a naval station for part of the Roman fleet, and con-structed a large harbour. The town was destroyed in 890 by the Saracens.

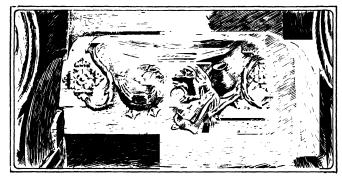
Misercre, the 51st Psalm (50th in the Vulgate), generally ascribed to David, in connection with his sin with Bathsheba, but probably of later date. The church has adopted it as the proper language for the expression of penitence. It forms part of the 'commina-tion service,' which is read on Ash Wednesday, and the tenth, eleventh, and fifteenth verses are incorporated in the versicles at matins and evensong.

perform other charitable offices. During the great plague (1348-9) they were especially active. The members wear a monastic dress, with cowl drawn over the face.

Mishawaka, tn., St. Joseph co., Indiana, U.S.A., 72 m. s.e. of Chicago; manufactures machinery, agricultural implements and paper pulp. Pop. (1900) 5,560.

Mishna, the name given to the chief depository of the Jewish oral law, which forms what may be called the text of the Talmud, as distinguished from the Gemara, or commentary. It contains the Halakha (Rules) spoken of at MIDRASH, and was by some regarded as coeval with the Torah or written law of Moses. The earliest groupings of the oral law were made by the school of Hillel; but the Mishna, as now extant, was largely collected and arranged by Rabbi Jehuda Hannasi (c. 220 A.D.). Probably, however, it was not committed to writing before the 5th century A.D. See TALMUD.

Misilmeri, tn., prov. Palermo, Sicily, 8 m. s.E. of Palermo. It has a castle, perched on a dominating hill. Pop. (1901) 13,247.



Carved Miscrere in Excter Cathedral.

Miserere, called also MISERI-CORDS or PATIENCES, are the seats or stalls in the chancels of cathedrals and collegiate churches. The lower part is adorned with carvings, some of which exhibit fabulous animals from the mediæval bestiaries, typifying the various sins, while others are simply domestic scenes of the time, a few are Scriptural, and many are caricatures on the then existing dresses and customs. The misdresses and customs. erere in Exeter Cathedral are said to be the oldest (between 1224 and 1240) and most complete in the world. There are also very fine ones at Ludlow and Nantwich.

Misericordia, or BROTHERS OF MERCY, a society of laymen in Florence, founded in 1240, who tend the sick, bury the dead, and

Misiones, territory of Argentine Republic, between the rivers Parana and Uruguay. It is partly hilly, and covered with tropical forests. Sugar, tobacco, and yerba mate, or Paraguay tea, are produced. The chief town is and yeron mute, of Language are produced. The chief town is Posadas, on the Paraná. Area, 11,282 sq. m. Pop. (1900) 32,521. Miskolcz, tn., prov. Borsod, Hungary, 24 m. N.E. of Erlau.

Its Gothic church dates from the 13th century. It manufactures flour, pottery, and porcelain. Pop.

(1900) 40,833.

Mispickel, arsenical pyrites, FeSAs, the principal ore of arsenic, occurs in large quantities in Cornwall, Germany, and the United States. It forms hard (H. 5'5) steel-gray orthorhombic crystals, which give off arsenic when heated.

Misprision. Misprision of felony or treason consists in concealing or not revealing to the proper authorities a felony or treason of which the party is cognizant. As to felony, it is practically obsolete. The term was formerly applied to any heinous misdemeanour which had no specific name.

Misrepresentation is distinguished from fraud in that it is an innocent misstatement of fact. If it is material to the subjectmatter of a contract, the party deceived may resist specific performance or claim rescission, but it does not afford ground for an action for damages. Generally, innocent misrepresentations of law, of intention, of motive or object, of value or of opinion, have no effect on a contract. In Scotland the term is applied both to innocent and fraudulent misrepresentation. The former is known as error. See also Mistake.

Missal, the book containing the office of the mass. After the Council of Trent it was ordered (1570) that all churches which could not prove the uninterrupted use of a service book during the previous two hundred years should adopt the authorized Roman missal. The English missal was used till about the close of the 17th century, and the Gallican in France till much more recently. The missal is largely composed of rubrical instructions of a very minute kind. In the olden days much of the ritual had been left to the discretion of the priest. The missal was revised in 1604, and again in 1634.



Missel Thrush.

Missel Thrush, or MISTLETOE THRUSH (Turdus viscivorus). It is stated that this bird has been displacing the true or song thrush in Britain, but this is doubtful. The missel thrush may be recognized by its general grayish tint as contrasted with the browner colour of the song thrush, the bolder spots on the under surface, and the larger

size (eleven inches as compared with nine inches). In Britain the bird feeds largely on berries, holly, rowan, hawthorn, and ivy, in default of the mistletoe berries to which it seems so partial elsewhere. To this diet, however, it adds garden fruit, worms, snails, and insects. The bird breeds early, it has a somewhat harsh note, and from its habit of singing during stormy weather in early spring it is sometimes called the 'storm cock.'

Missions, HISTORY OF, is the history of the expansion of the Christian church. By 100 A.D. converts were won in Syria, Asia Minor, Greece, Rome, Alexandria, Babylon, and perhaps in Spain and Britain. In the 2nd century the gospel reached Edessa, Parthia, Persia, Media, Bactria, Mauritania, Germany, and Brit-Vigorous churches existed in Gaul. Pantænus presided in Alexandria over the first missionary college, and about 190 was the first historical missionary to India, which may mean Hindustan, Arabia, or Abyssinia. Progress continued in the 3rd century in spite of persecutions, and by 250 A.D. the Christians formed one-twentieth of the subjects of the Roman empire. The Goths the Roman empire. The Goths in Mosia received the gospel from captives carried off in their inroads. Armenia was the first country to adopt Christianity as the state religion. The 4th century witnessed the final and severest persecution under Diocletian (303), during which British markers suffered doth at ish martyrs suffered death at Verulamium, now St. Albans. But in 324, after Constantine's conversion, Christianity became the imperial religion. In 381 Theodosius abolished paganism, closing the temples and confiscating their property. The Goths were enlightened by Ulfilas (318-388), who gave them an alphabet and the Bible in their own tongue. His work was continued by other Goths trained in the missionary college which Chrysostom founded at Constantinople in 404. In this century the Abyssinian Church was founded, and the conversion of the Iberians accomplished. great light of the 5th century was St. Patrick (395-493), who evangelized Ireland and origi-nated the great line of Irish-Scottish missionaries, who, dur-ing four centuries, carried the gospel and civilization through France, Switzerland, Italy, and Germany. The most distinguished were Columba (521-597), the evangelist of the Scots from Iona; Aidan (635), the apostle of Northumbria; Columbanus and Gallus (559-615), who evangelized Italy and Switzerland; Hilda (614-680), the foundress of the

missionary monastery of Whitby; and Kilian, the apostle and martyr of Franconia. At the close of the 6th century, St. Augustine (596-607), sent by Gregory the Great, visited Britain, and became the first archbishop of Canterbury. During this progress in the West, the Nestorians. though condemned at the council of Ephesus (431), carried on extensive missions in Asia. They founded a Tartar church in Khwarezm (Khiva), preached in India, and planted churches in China which lasted till about 900. In the 8th century, Boniface (680-755), born in Devonshire, evangelized Friesland, Hesse, and Saxony. The conversion of the Northmen was begun in earnest in the 9th century by Ansgar of Corbie, near Amiens; but Denmark was not Christianized till 1030, under Canute, who also sent missionaries to complete the work in Scandinavia. Disciples of Ansgar reached Iceland and Greenland. The Slavs were evangelized in 861 by Cyril and Methodius of the Greek Church, which also reached the Austrian and Russian Slavs in the 10th and 11th centuries; and the conversion of Europe was nearly completed by the baptism of Vladimir of Russia and his people in 988. Only two names need be mentioned in the next five centuries up to the reformation (1517). Ramon Lull, born in Majorca in 1236, was the first missionary to the Mohammedans, whom he tried to convert by his philosophical system, and by establishing missionary colleges. He preached in Tunis, Cyprus, and Armenia, and died a martyr's death in Africa (1315). Monte Corvino, a Franciscan missionary, baptized six thousand Chinese. and became archbishop of Peking (1305). The reformation originated only two missions. In 1556 Coligny sent men chosen by Calvin to the French colony in Brazil, but the settlement in Brazil, but the settlement proved a failure. In 1559 Gus-tavus Vasa of Sweden began a mission to the Lapps of N.

Europe.

Roman Catholic missions practically date from the foundation of the Jesuit order by Loyola in 1534. Xavier went to Goa in 1542, and laboured for ten years in S. India, the Eastern archipelago, and Japan. His greatest success was in Japan; but the work did not last. Ricci entered China. In 1622 the Congregation for the Propagation of the Faith was founded at Rome, and in 1627 the College for the same purpose, and before long the Congregation of Priests and the Seminary for Foreign Missions in Paris. By the middle of the 18th century the early zeal and vigour

had largely disappeared. In 1822 L'Œuvre de la Propagation de la Foi was started in Lyons; it now raises about £300,000 a year. In recent times missions under the direction of the Propaganda have been actively pushed in China, India, Japan, Polynesia, New Guinea, Africa, and Madagascar, and are reckoned to have gained about four million converts.

The 16th century also witnessed successful missions of the Dutch in their colonies in Malaysia, S. India, Ceylon, and Brazil, a missionary college being formed in Leyden. In 1588 Sir Walter Raleigh gave £100 to the Virginia Company for the propagation of Christianity in that settlementthe first recorded missionary donation in England. In 1649, under Cromwell, the Corporation for the Propagation of the Gospel in New England was formed. John Eliot (1604-90), the apostle of the North American Indians, was connected with this corporation, which was reconstituted in 1662 under Boyle, and is still at work as The New England Company. In 1664an Austrian, Baron von Welz, went to Dutch Guiana. In 1699 was founded the Society for Promoting Christian Knowledge. It now spends over £10,000 a year in publishing and circulating Christian literature in hea-then lands. The Society for the Propagation of the Gospel was founded in 1701, to maintain an orthodox clergy in Great Britain beyond the seas, and to make other provision for the propaga-tion of the gospel in those parts. Since 1821 it has developed considerable missionary activity, but the larger part of its work is among English-speaking people abroad. Scattered throughout the British empire it has 4,520 stations and outstations, 520 male missionaries, 186 female (including wives), 3,200 native helpers;

income in Great Britain, £152,530. The Davish Halle Mission to India was begun in 1704 through Dr. Lutken, chaplain of Frederick IV., and a missionary college was started in Copenhagen. From the Copenhagen college Hans Egede (1686-1758) went forth to the Eskimos. It was the meeting between Zinzendorf and Egede at Copenhagen in 1731 that originated the missionary fervour of the Moravian Church, whose first missionaries went out to St. Thomas (W. Indies) in 1732. The Moravians have proved the most missionary church, and now have over 379 stations and outstations in N. and S. America, S. and Central Africa, Australia, and Central Africa, Australia, and Central Asia, 200 male missionaries, 194 female (including wives), 1,864 native helpers; income from Great Britain, £21,606.

The evangelical revival of the 18th century under Whitefield and Wesley was quickly followed by the formation of missionary societies, and was the inspiration under which modern missions began. In 1792 the Baptist Missionary Society was founded, of which Carey, who laboured forty-one years in Bengal with-out a break, was the first missionary. The society, which was amalgamated in 1891 with the General Baptist Society, now has, including the Baptist Zenana Mission, 859 stations and outstations in India, China, Africa, W. Indies, Brittany, and Italy, 141 male missionaries, 183 female (including wives), 808 native helpers, and income £97,626. In 1795 the London Missionary Society was founded on an undenominational basis by Congregationalists, Episcopalians, and Presbyterians. It is now mainly supported by Congregationalists, and has 1,357 stations and outstations in the South Seas, New Guinea, W. Indies, India, China, Africa, and Madagascar, 210 male missionaries, 238 female (including wives), 6,462 native helpers, and income £145,271. Henry Martyn went out as a chaplain of the East India Company in His brilliant missionary life, which terminated at Tokat in 1812, gave great impulse to the missionary movement. In 1799 the Church Missionary Society was founded by Evangelical churchmen, under the name of the Society for Missions to Africa and the East, and has become the and the East, and has become the largest of missionary societies. It has 590 stations and outstations in Africa, Palestine, Persia, India, China, and Canada, 571 male missionaries, and 757 female (including wives), 8,106 native helpers, and income of £353,163. The Church of England Zenana Missionary Society, founded in 1880, has 64 stations and outstations in India, 210 missionaries, 917 native helpers,

and an income of £56,733.

The Religious Truct Society, formed in 1799, does a wide work in many lands in the production of Christian literature. The British and Foreign Bible Society, formed in 1804, is the most helpful auxiliary of all missionary societies. The National Bible Society of Scotland was formed in 1861 by an amalgamation of Scottish Bible societies which existed earlier in the century. The Wesleyans, whose first missionary, Dr. Coke, laboured in the W. Indies from 1786 to 1814, did not form the Wesleyan Methodist Missionary Society till 1813. Including its work amongst English people abroad, and its women's auxiliary, it has now 2,818 stations and outstations

in Europe, India, China, Africa, and W. Indies, 216 male missionaries, 242 female (including wives), 3,634 native helpers, and income £153,789. The Presbyterian churches have carried on mission work as part of their church organization, instead of forming more or less independent societies. The Church of Scotland sent Duff to India in 1829, and now has in India, China, and Africa 84 mission stations and outstations, 50 male missionaries and 82 female (inmissionaries and 82 female (including wives), 855 native helpers, and income £41,976. The Free Church of Scotland began work in 1843, and the United Presbyterian Church in 1847. They (along with the smaller body which still retains the title of Free Church) now have, as the United Free Church of Scotland Foreign Missions, 827 stations and outstations in India, China, Africa, Melanesia, and W. Indies, 199 male missionaries, 207 female (including wives), 2,813 native helpers, and income £108,309.
The Presbyteria i Church of Ireland Missions (begun in 1840) have in India 37 stations and outstations, 19 male missionaries. 32 female (including wives), 284 native helpers, with an income of £15,081. The Presbyterian of £15,081. The Presbyterian Church of England Missions (begun in 1847) have in China and India 261 stations and outstations, 43 male missionaries and 58 female (including wives), 401 native helpers, and income £26,510. The Welsh Calvinistic Methodist Foreign Missions (begun 1840) have 20 stations and outstations in Assam and Brittany, 20 male missionaries, female (including wives), 1,074 native helpers, with an income of £10,303. The United Metho-dist Free Churches Mission, founded 1857, here in Chicafounded 1857, has in China, Africa, and Jamaica 193 stations and outstations, 26 male missionaries and 22 female (includsionaries and 22 female (including wives), 584 native helpers, and income of £12,647. The Universities' Mission to Central Africa (Church of England), founded 1859, has 69 male missionaries, 48 female, 207 native helpers, and income of £30,371. The Friends' Foreign Missionary Association, founded 1865, has in China, India, and Madagascar 248 stations and outstations, 35 male missionaries and 59 female (including wives), 978 native helpers, and income of £24,512. The South American Missionary Society (Church of England), begun in 1844 after the splendid devotion of Captain Gardiner, has in S. America 54 stations and outstations, 38 male missionaries, 33 female (including wives). 46 native helpers, and income of £15.746.

The chief undenominational societies are:—

The Zenana Bible and Medical Mission, founded 1852. It has in India 37 stations and outstations, 157 missionaries, 275 native helpers, and an income of £26,413. The China Inland Mission, founded by Dr. Hudson Taylor in 1862, has in China 306 male missionaries, 456 female (including wives), and income of £51,446. Medical missions are carried on

Medical missions are carried on by most of the societies. The Edinburgh Medical Missionary Society (founded 1841) trains men and women as medical missionaries.

The chief American societies are the American Board of Commissioners for Foreign Missions (practically Congregational), formed 1810, with 1,402 stations and outstations in Africa, Turkey, India, China, the Pacific, S. America, Spain, and Austria, 189 male missionaries, 360 female (including wives), 3,581 native helpers, and income of £170,000; the American Baptist Missionary Union, formed 1814, with 1,739 stations and outstations in India, China, Japan, Africa, and Europe, 193 male missionaries, 288 fcmale (including wives), 3,325 native helpers, and income of £136,104; the Methodist Episcopal Church missions, formed 1819, with 363 male missionaries, 539 female (including wives), 6,403 native helpers in Africa, S. America, China, Japan, India, and Europe, and income of £317,730. The Presbyterian Boards—North formed 1927 and South formed formed 1837, and South formed 1861-have, in America, the East, and Africa, 1,628 stations and outstations, 375 male missionaries, 606 female (including wives), 2,015 native helpers, and income of £248,967.

The chief continental societies are the Netherlands Missionary Society, founded in 1797; the Basel Society, founded 1815; the Berlin Society, founded 1823; the Paris Society for Evanyelical Missions, founded 1825; and the Rhenish Society, founded 1828. Missions to the Jews are con-

Missions to the Jews are conducted by several agencies, the chief of which are The London Society for Promoting Christianity among the Jews, founded 1809 (Church of England); and the British Society for the Propagation of the Gospel among the Jews, founded 1842 (undenominational). The total expenditure of these and other societies is reckoned at £70,000.

Amongst the leading missionaries of the 19th century have been, in Africa, Schmidt, Van der Kemp, Moffat, Livingstone, Krapf, Mackenzie, Steere, Hannington, Saker, Comber, Mackay, and Crowther; in India, Carey, Martyn, Ringeltaube, Judson, Duff, Wilson, Rhenius, Sargent;

in China, Morrison, Legge, Lockhart, Burns, Moule, Taylor, Hill, John; in Oceania, Archdeacon Williams, J. Williams, Patteson, Turner, Paton, Calvert, and Chalmers. See Smith's Short History of Christian Missions (1890); Bliss's Concise History of Missions (1897); Warneck's

of Missions (1893); Williams's The Middle Kingdom (1883); Lowe's Medical Missions (1887); Smith's Chinese Characteristics (1894); Smith's Conversion of India (1893); Sherring's History of Protestant Missions in India (1884); Christlieb's Protestant Foreign Missions (1880). For

Statistics of Protestant Societies at end of 19th Century.

The state of the s						
	Societies.	Stations and Out- stations.	Missionaries Male and Female).	Native Helpers.	Communi- cants.	Income.
American. United Kingdom Continental Asia Australasia and Oceania. Africa	128 154 82 117 35 42	8,841 12,843 3,147 820 1,756 3,129	5,203 9,434 2,519 508 487 531	23,676 33,812 10,428 1,271 4,971 5,238	575,216 511,443 228,704 66,267 48,637 120,462	£1,364,094 1,918,796 590,300 80,918 71,561 81,267
Total	558	30,536	18,682	79,396	1,550,729	£4,115,936

Outline of the History of Protestant Missions from Reformation to Present Time (1884); Hutton's History of the Moruvian Church (1895); Dennis's Christian Missions and Social Progress (1897); Dennis's Centennial Survey of Foreign Missions (1902); Thompson and Johnson's British Foreign Missions (1809); Lovett's

missionary biographies, see J. Page's Rev. D. Brainerd (1892); J. Smith's Life of William Carey (1885), Henry Martyn, Saint and Scholar (1892), and Life of Alexander Duff (1879); J. S. Mossais (son) Lives of Robert and Mary Mossais (1886); W. G. Blackie's Personal Life of Livingstone (1894); Charlotte M. Yonge's

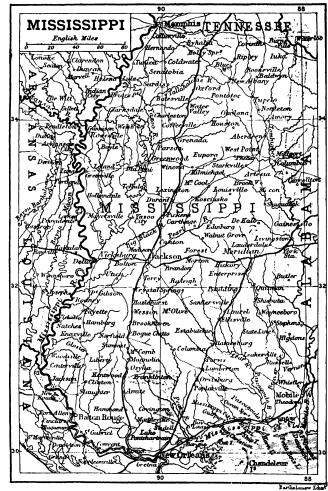


History of London Missionary Society (1899); Horne's Story of the London Missionary Society (1894); Stock's History of Church Missionary Society (1899); Canton's History of the British and Foreign Bible Society (1904); Guinness's Story of China Inland Mission (1893); Pierson's Divine Enterprise Life of Bishop Patteson (1888); Dawson's History of the Life and Work of Bishop Hannington (1888); Autobiography of Rev. J. G. Paton (1889); A. M. Mackay, by his sister (1890); Lovett's Life of James Chalmers (1903); and Speer's Missions and Modern History (1905).

Mississippi. (1.) Southern tate of U.S.A., with an area of 46,810 sq. m. It was admitted to the Union as a state in 1817. The surface is everywhere low, in few surface is everywhere low, in few places exceeding 500 ft. above sea-level. Much of the W. part, bordering the Mississippi, and drained by that river and the Yazoo, is a low alluvial bottom land, subject to flooding, except where protected by levees. Most of the state is forested with yellow pine. Almost the only industry is agriculture, and the chief crop is cotton; next comes Indian corn. The capital is Jackson, and the principal city Vicksburg. Pop. (1900) 1,551,270. The number of negroes was 5'4 per cent. of the total. (2.) The greatest river of N. America. It rises in Lake Itasca, N. Minnesota, and has a length of 2.500 m. The Missouri, however, is its longest branch, and including it the river has a total length of 4,200 m. The Mississippi, after leaving Lake Itasca, pursues a devious course through many lakes and marshes. Below the St. Anthony Falls at Minneapolis its course becomes much more regular, and no further rapids are encountered until Rock I. is reached, on the w. boundary of Illinois. Further rapids occur at Keokuk, in the s.E. corner of Iowa. Just above St. Louis it receives the waters of the Missouri from the w., and, at the s. point of Illinois, those of the Ohio from the E. To this point the river flows in a bottom land of no great breadth, bordered by bluffs from 200 to 300 of the Ohio the Mississippi flows in a broad delta plain, the river being, as far as the s. boundary of Tennessee, upon the E. side of this plain, but shifts to the w. from that point as far as Vicksburg, then again to the E.; while in lower Louisiana its plain lies on both sides of the From the foot of St. Anriver. thony Falls to the mouth of the Ohio the average descent is a little less than half a foot to a mile; while from the latter point to its mouth it is about one quarter of a foot, or three inches to a mile. The bottom lands below the mouth of the Ohio lie in the main slightly below the high-water level of the river, and these lands are protected from overflow by levees. Much of this bottom land is marshy. Below the mouth of the Red R., in the middle of Louisiana, the river has numerous distributaries, the principal of which are the bayous Atchafalaya and Lafourche. The river enters the Gulf of Mexico through a delta, the principal channels of which are South-west Pass, South Pass, and Pass à

Loutre. Of these, South Pass has been improved by means of jetties, by which the current has been made to cut away the bar at the entrance, giving 34 ft. depth of water at the entrance to the pass, and improving the position of New Orleans as a southern port. The drainage basin of the Mississippi includes 1,240,039 sq. m. Its affluents on

Forks in Montana, with the exception of a break at the Great Falls. The Arkansas is navigable to Wichita, Kansas, and the Red R. to Shreveport in N.W. Louisiana. The total navigable length of the entire drainage system is not far short of 15,000 m. The river was discovered by De Soto in 1541, and explored by Marquette and Joliet in 1673 and by



the E., most of which are tributary to the Ohio, drain the w. slopes of the Appalachian mountains. Its affluents on the w., tributary to the Red R., the Arkansas, and the Missouri, drain nearly all of the E. front of the Rocky Mts. and the great plains. The main river is navigable from its mouth to Minneapolis, the Ohio from its mouth to Pittsburg, and the Missouri to the Three

La Salle in 1682. From 1783 to 1803 it formed the western boundary of the United States. See Humphreys and Abbot's Physics and Hydraulics of the Mississippi River (1876); Ockerson and Stewart's The Mississippi River (1893); History of the Mississippi Valley, by Shea (1903), and by Spears and Clark (1903).

Mississippi Scheme, a scheme of colonization launched by John

Law, the financier, in 1717. His Louisiana Company acquired rights over the whole territory drained by the Mississippi, the Ohio, and the Missouri. In 1718 the company bought the monopoly of tobacco, and in 1719 it undertook the management of the mint and farmed the rev-enue from the government. In this way it controlled the whole colonial trade, and had in its hands the management of the currency and the finance of France. Shares in the company rose to a height which even England's South Sea Bubble could not rival. Law in 1720 became controller-general of the national finances, and attempted to amalgamate the company and the Banque Generale (Banque Roy-

Missolonghi, or Mesolonghi, fort. tn.. prov. Acarnania and Ætolia, Greece, on Gulf of Patras, 20 m. N.W. of Patras, and situated in a marshy plain. It sustained two sieges from the Turks, in 1822 and 1825-6, and during those years was the chief western stronghold of the Greek patriots. Lord Byron died here on April 19, 1824. A mausoleum contains his heart, and a statue of him was erected in 1881. Currants and valonia are exported. Pop. (896) 8,394.

Missoula, city, Montana, U.S.A., co. seat of Missoula co., on r. bk. of Missoula R., 95 m. W. of Helena, with the state university. Pop. (1900) 4,366.

Missouri. (1.) Central state

U.S.A., organized as a terri-



This proposal pricked the bubble of public confidence. There was a run on the bank, and a panic ensued, which was intensified by a decree reducing the value of the bank's paper. Finally the bank stopped payment. Law had to flee before the storm, and spent his latter days in Italy.

Missive, in Scots law, a memorandum in writing. A binding sale of land may be effected by an interchange of missives, in which one party offers to buy or sell on certain conditions and the other party accepts the offer. A lease may be made by a missive or letter by the proprietors accepted by the lessee. Missives of sale or lease require to be stamped if they are to be used as evidence.

tory in 1812, and admitted as a state in 1821. Area, 69,415 sq. m. It was formed from a part of the Louisiana purchase (1803), and is divided nearly in half by the Missouri, which traverses it from W. to E., while along its E. border flows the Mississippi. The coun-try N. of the Missouri is a rolling prairie, wooded only in part; and the country s. of this river is, in the main, forest-clad. The land rises gradually southward into the plateau which forms the N. part of the Ozark Hills. The agricultural interests are very great, especially in the N. prairie portion. The principal crops are Indian corn, wheat, and oats. A little cotton is raised in the S.E. Missouri yields much of the lead

and nearly all the zinc produced in the country. Coal also is pro-duced. The manufactures are for the most part concentrated in St. Louis. The leading products are those of slaughtering and meat-packing, tobacco, flour, foundry and machine-shop products, malt liquors, lumber, and boots and shoes. Pop. (1900) 3,106,665,51 per cent. being males and 49 per cent. females. Negroes amounted to 5 per cent. (2.) River of United States, the longest branch of the Mississippi. It rises in S.W. Montana by the junction of three streams-the Jefferson, the Madison, and the Gallatin. From the junction the river flows N. and N.E., and after a long course E. through Montana it turns to the s.E., and crosses N. and S. Dakota. It serves as the boundary line between Kansas and Nebraska on the w., and Iowa and Missouri on the E., and finally crosses the last-named state to its junction with the Mississippi, a few miles above St. Louis. It is navigable from its mouth to Great Falls, in Central Montana, and above these falls to the Three Forks. Even at low stages the river is heavily loaded with detritus, from which it has acquired the popular cognomen of 'Big Muddy.' The drainage basin covers 527,155 sq. m. The length from its mouth to the Three Forks is 2,340 m., and to the head of Jefferson R., the longest of the forks, is 2,950 m.

Missouri, Kansas, and Texas Railroad, incorporated in 1876, took over the Pacific Railroad Company of Missouri. In 1880 it was amalgamated with the St. Louis and Lexington, the Kansas City and Eastern, the Lexington and Southern, the St. Louis, Kansas, and Arizona, the Missouri River, and the Leavenworth, Atchison, and North-western Railroads. The system has a total length of 2,941 miles, covering the greater part of Kansas, Colorado, Missouri, Arkansas, Louisiana, and Utah. The total capital is £27,500,000. In 1001-5 there was a surplus of revenue amounting to £250,000; but no dividend has been paid on the ordinary shares.

Mist is very similar to fcg, but the water particles are somewhat larger and are much more wet-ting. It is really a cloud in contact with or suspended immediately over the surface of the ground or sea. The term 'Scotch mist' is applied to the coarser water particles which coalesce into tiny raindrops.

Mistake. Generally if a party to a contract makes a mistake he must stand by it, and where a mistake is made as to law this rule is invariable. But sometimes mistake is of such a character that there has been no consent,

and therefore no real contract; then the contract is void. For example, mistakes may occur as to parties; as to the nature of the contract; as to the existence of the subject-matter; through ambiguity as to the matter; as to the quality or quantity of what the seller is selling. If a contract does not express the intention of the parties, and that intention can be ascertained, it may be rectified. In Scotland mistake is spoken of as error, a term which also includes innocent misrepresentation.

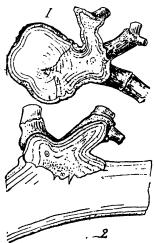
Mistassini, lake, Quebec, Canada; is about 120 m. long and 20 m. broad; area 975 sq. m. It discharges w. into James Bay by

the Rupert R.



Branch of Mistletoe.

Mistletoe, British parasitic shrub (Viscum album) belonging to the order Loranthaceæ.



Mistletoe growing on branch. 1, Cross section; 2, longitudinal section.

grows on a variety of trees, but is perhaps most commonly found on the apple, very rarely on the oak. It bears thick yellowishgreen leaves and staminate or pistillate flowers (the different sexes appearing on separate plants), which are followed by white one-seeded berries that ripen towards winter. In the eyes of the Druids it was sacred, and used to be cut with great religious ceremony, especially when found growing on the oak. They imputed to it medicinal virtues, looking upon it as a species of all-heal. It plays a consider-able part in the folklore of certain parts of N. and W. Europe.

Mistletoe Thrush. See Mis-

SEL THRUSH.

Mistral, the violent north wind blowing from the cold, snow-covered plateau of Central France down the valley of the Rhone to the Gulf of Lions. It owes its origin to the simultaneous presence of a low atmospheric pressure in the Gulf of Lions and a high-pressure area in the north. The unseasonable cold which sometimes prevails in the Riviera is due to this wind.

Mistral, FRÉDÉRIC (1830), Provençal poet, born at Maillane (Bouches-du-Rhône). Together with Roumanille he threw himself into the movement of a Provençal literary revival, and became one of the seven founders of the Felibrige in 1854. The rustic epic Mirèlo, which appeared in 1859, at once placed Mistral at the head of the school. Two further epics, a play, a verse narrative, and a number of short pieces contained enough admirable poetry to sustain his reputation. Mirèio tells the tragic love story of a rich girl and a poor peasant in a perfect style, and with touching simplicity and directness. The theme was set to music by Gounod, and English translations have been made by Grant (1867), Preston (3rd ed. 1890), and Crichton (1868). Mistral spent many years in collecting the proverbs, legends, folklore, etc., of Provence, which he incorporated in his Tresor dou Felibrige (1886). In 1905 he shared the Nobel prize for literature with the Spanish playwright Echega-See monographs by Welter (1899) and Downer (1901), and Lefèvre's Bibliographie Mistralienne (1903).

Mistretta, tn., prov. Messina, Sicily, 34 m. N.E. of Caltanis-setta. Pop. (1901) 14,041.

Mitau, or MITAVA (often misspelt Mittau; in Lettish, Yelgava), cap. Courland gov., W. Russia, 26 m. s.w. of Riga. It has tanneries and cloth works, and makes tin articles, linen, and white lead. From 1561 to 1795 it was the capital of the duchy of Courland. It was the favourite residence of Marshal Biron, ruling courtier of Empress Anne. Pop. (1897) 35,011.

Mitcham, vil. in Surrey, England, 9 m. s.w. of Westminster Bridge. The ancient flint church of Sts. Peter and Paul was rebuilt in 1821. In the vicinity are large market gardens and fields of medicinal plants, and sweet herbs for the manufacture of essences. The Cranmer family was long associated with Mitcham. Pop. (1901) 14,904.

Mitchel, JOHN (1815-75), Irish patriot, born at Camnish, Co. Londonderry. In 1845 he went to Dublin as assistant editor of the Nation, and in 1848 started a weekly paper, the United Irish-man; was tried for sedition, and sentenced to fourteen years' transportation. Heescaped (1853), transportation. Heescaped (1893), and settled in America. His chief works are Life of Aodh O'Neil (1846), Jail Journal (1854), and History of Ireland (1887). See Life by W. Dillon (1888). Mitchell, city, Davison co., S. Dakota, U.S.A., 70 m. w. of Sioux. It is the seat of the S. Dakota University, founded in 1888. Pop. (1900) 4,055. Mitchell. DONALD GRANT

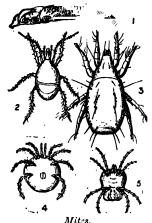
Mitchell, DONALD GRANT (1822), known as 'Ik Marvel,' American man of letters, born at Norwich, Connecticut; was United States consul to Venice (1853-4). He wrote Fresh Gleanings (1847); The Battle Summer, or Paris in 1848 (1849); The Lorgnette (1850); Reveries of a Bachelor (1850); Dream Life (1852); oor (1800); Dream Life (1852); Fudge Doings (1855); My Farm of Edgewood (1863); Dr. Johns (1866); Daniel Tyler (1883); Eng-lish Lands, Letters, and Kings (1889-97); American Lands and Letters (1897-9).

Mitchell, Peter (1821-99), Canadian statesman, born at Newcastle, New Brunswick. He took a leading part in the federation movement, and when the Dominion government was formed (1867) he became minister of editor of the Montreal Herald from 1873.

Mitchell, SILAS WEIR (1830), American physician and nov-elist, was born at Philadelphia. He has gained a reputation by his advocacy of the 'rest treatment' for nervous diseases. (See WEIR MITCHELL TREATMENT.)
Amongst medical books he has written Wear and Tear, or Hints for the Overworked (4th ed. 1874), and Fat and Blood (4th ed. 1885). As a novelist he has written *Hugh* Wynne, Free Quaker (1897), The Adventures of François (1899), When All the Woods are Green (1894), Dr. North and his Friends (1900), Circumstances (1901), and A Comedy of Conscience (1904).

Mites, small arachnids which, together with ticks, constitute the order Acarina. A large number are parasitic-some, like the itchmite, giving rise to disease in man.

A few are carnivorous and freeliving, feeding upon minute insects such as Aphides. Most mites are degenerate, and some are strangely modified in accordance with a special mode of life-e.g. the follicle mite (Demodex folliculorum), which is vermiform in appearance, and lives in the sebaceous sacs and hair follicles of man. In many cases tracheal tubes are absent, and the animals have re-



1. Demodex folliculorum, larva; 2. Gamasus coleoptratorum; 3. Tyroglyphus mycophagus; 4. Atax spinipes; 5. Trombidium holosericeum.

turned to the primitive method of breathing by the skin. The habitat is very varied; for mites occur on the animals and plants which they infest-e.g. beetlemites (Gamasus); among organic matter—c.g. cheese-mites (Tyro-glyphus), which destroy not only cheese, but flour and similar substances; in water, both fresh and salt -e.g. species of Atax and similar forms; or as adults freely at the surface of the ground—c.y. species of Trombidium, the harvest-mite. There is usually a slight metamorphosis in development, the young being hatched with six legs, and acquiring the

fourth pair later.
Mitford, MARY RUSSELL (1787-1855), English novelist and dramatist, born at Alresford, Hampshire; was a voluminous contributor to the magazines of the day, especially The Lady's Magazine, in which appeared her sketches entitled Our Village, in 1819, reprinted in 5 vols. 1824-1832. She wrote four tragedies, Julian, Foscari, Rienzi, and Charles I.—all produced at Covent Garden or Drury Lane. Her other works comprise Dramatic Scenes (1827), Belford Regis (1835), Recollections of a Literary Life (1852), and Atherton and Other Tales (1854). She was a brilliant conver-

sationist and letter-writer. See L'Estrange's Life of Miss Mary R. Mitford (1869), and The Friendships of Mary R. Mitford (1882).
Mitford, WILLIAM (1744-1827), English historian, was born in London. In 1774 he published

his Inquiry into the Principles of Harmony in Language, and afterwards a Treatise on the Military Force. His chief work was a History of Greece, in 5 vols. (1784-1810), long the standard work on the subject.

work on the subject.

Mithras, originally one of the three principal gods of the ancient Persians, though later he sank into a subordinate position to Ahura-Mazda (Ormuzd). He was the god of light, external and internal, hence the god of wisdom and of moral purity. After the Persian conquest of Assyria and Babylonia his worship became much more prominent, and came much more prominent, and Mithras himself was identified with the sun. This religion was introduced into Rome after Pompey's conquest of Pontus, 67 B.C. Between 100 A.D. and 378 it flourished greatly in the Roman empire, but was prohibited in the latter year. Candidates had to undergo a long process of initiation, and had to submit to many severe trials of physical endurance by fire, water, and fasting. There were a ceremony of baptism and an oblation of bread and water, and other rites. In these respects, and in its belief in the mystic soul-sacrifice of Mithras (i.e. vicarious redemption), Mithraism resembled Christianity, but there was no real connection between them. See Cumont's Les Mystères de Mithras (2nd ed. 1902), and Dieterich's Eine Mithrasliturgie (1904).

Mithridates, more correctly MITHRADATES (132 or 131 to 63 B.C.), king of Pontus in Asia Minor, was a man of extraordinary powers; he is said to have spoken twenty-five languages; he made a special study of poisons and their antidotes. He became king at eleven years of age. About 114 B.C. he added to his dominions the kingdom of Bosporus (the modern Crimea), Cappadocia, and Paphlagonia. In 94 the Romans ordered him to give up Cappadocia. This led, give up Cappadocia. This led, in 88 B.C., to the first Mithridatic war. After seizing the Roman province of Asia, and causing 80,000 Italians to be massacred on one day, Mithridates sent a force over into Greece; but Sulla defeated his general, Archelaus, there, and he himself was defeated in Asia by Fimbria, and made peace in 84. The second war, in 83 and 82, was due to the aggressions of Muræna, Sulla's lieutenant. The third war lasted from 74 to 63 B.C. In it Lucullus at first overpowered Mithridates,

and expelled him from Pontus into Armenia; but owing to the mutiny of Lucullus's soldiers, Mithridates recovered Pontus in 68. In 66 Pompey again defeated and expelled Mithridates, and he took refuge in the Crimes. At last he committed suicide.

Mitla, or MICTLAN, vil., Mexico, 30 m. s.E. of Oaxaca, with ruins of Zapotecan temples or palaces and tombs. Fine mosaic surface decorations form a feature of two of the groups, and mural paintings of a third. Sculpture is almost entirely wanting. See Holmes's Archeol. Studies among the Ancient Cities of Mexico,' in Publications of the Field Columbian Museum (1897); and Saville's Cruciform Structures near Mitla in Bull. of Amer. Museum of Nat. Hist., vol. xii. (1900).

Mito. See MYTHO.
Mitrailleuse. See Guns-Machine.

Mitraria, a genus of half-hardy evergreen shrubs belonging to the order Gesneracea. There is only one species, M. coccinea, which bears long solitary inflated tubular scarlet A wellflowers in summer. A well-drained, light, peaty loam and a moist, shady situation are desiderata.



Mitre, the headdress of bishops, a cap with two peaks or horns, and two strings falling over the shoulders, which came into general use during the 12th century. Originally of simple white linen, and only a few inches high, in the 14th century it was over a foot high, and adorned with precious stones and gold and silver plates. After the reformation it fell into disuse, until resumed by the bishop of Lincoln (1885).

Mitscherlich, Eilhard (1794-1863), German chemist, was born near Jever in Oldenburg, and succeeded Klaproth in the chair of chemistry in Berlin (1821). Besides researches on the allotropic forms of sulphur, on the acids of manganese and selenium, and on benzene and its derivatives, he is perhaps most famous for his labours in crystallography and mineralogical chemistry; discov-

ering the principle of isomorphism, and methods of preparing minerals artificially. His chief minerals artificially. His chief book was Lehrbuch der Chemie (4th ed. 1840-8). See Life in German, by Rose (1864).

Mittweida, tn., Saxony, Germany, 12 m. by rail N.E. of Chemnitz, has cotton, woollen, and linen factories, engineering and furniture works. There is also a large technical institute for engineering. Pop., including Rössgen (1900), 16,119. Mitylene. See MYTILINI.

Mivart, St. George Jackson (1827 - 1900), English biologist, was born in London. He became professor of botany and zoology at the Roman Catholic university college in Kensington (1874), and later professor of the philosophy of natural history at Louvain (1890-3) in Belgium. He was especially interested in the anatomy of the carnivora, and his work on The Cit (1881) is a monograph of great interest and charm. He also contributed largely to the controversies on Darwinism and natural selection. He was excommunicated by the Roman Catholic Church six weeks before he died. He wrote Nature and Thought (1882), Genesis of Species (1871), The Origin of Human Reason (1889); also The Common Frog (1874), and Lessons from Nature (1876).

Mixtecs, civilized nation, Central America, whose territory (Mixtecapan) was conterminous with that of the kindred Zapotecs. Many still survive in S. Mexico.

Mixtures are non-homogeneous substances containing two or more elements or compounds. They are distinguished by the following features:—(1) The proportions in which their components can be put together are not fixed; (2) the properties of a mixture are intermediate between the properties of their components; and (3) they can be separated by taking advantage of the difference in properties of their components. For example, common gunpowder is composed of charcoal, saltpetre, and sulphur; varies somewhat in composition; possesses the blackness of the charcoal and the saline taste of saltpetre; and the saltpetre can be dissolved out by water and the sulphur by carbon disulphide, leaving the charcoal. The differences of property made use of in separating mixture are as follows: (1) difference in size of particles. taken advantage of in sifting and filtering, and indirectly to separate tough from brittle components; (2) differences in densityfor example, light particles float or can be easily washed away, while heavier ones settle, or light gases diffuse more rapidly than heavy

ones; (3) differences in solubility, employed in the various processes of extraction and crystallization; (4) differences of volatility, on which depend the methods of obtaining a non-volatile and dis-solved substance by evaporating its solution, or of separating two substances of different volatility by fractional distillation; and (5) special differences, such as the magnetic properties of iron, by which it can be removed from among non-magnetic components.

Miyadzu, or MIYAZU, fishing tn., Tango prov., on W. coast of Hondo, Japan, 50 m. N.W. of Kioto, is noted for the 'Heaven's Bridge, a narrow promontory, one of the 'three great sights' of Japan. Pop. 10,000.

Miyajima. See HIROSHIMA. Mizar = 5 Ursee Majoris, the first telescopic and also the first spectroscopic double star detected. Riccioli, in 1650, discovered its fourth-magnitude companion at 14"; and Pickering, in 1889, found the second-magnitude primary to be composed of two nearly equal white stars, mutually revolving in a period of

Mizpeh, or Mizpeh, several towns in Palestine. Mizpeh of Gilead (Gen. 31:49; Judges 10: 17 f.) was probably the present village Sûf in N. Gilead, remarkable for its rude stone monuments. Mizpeh of Benjamin (Joshua 18:26 ff.) lay north of Jerusalem, the exact site doubtful. Mizpeh of Judah (Joshua 15:38 ff.) probably stood near the vallet of Zeybetshab 21 rg v. u. valley of Zephathah, 31 m. N.W. of Jerusalem. Mizpeh of Moab (1 Sam. 22:3) is as yet unknown. The word 'Mizpah' on memorial rings alludes to the setting up of the heap of stones by Jacob and his brethren at Mizpah of Gilead.

M.J.I., Member of the Institute of Journalists.

Miösen, Norwegian lake, 62 m.

long, average breadth 2 m., 60 m. N. of Christiania. M.L.A., Member of Legislative

Assembly.

Mlawa, tn., Plock gov., Russian Poland, 50 m. N.N.E. of Plock. It possesses flour mills, breweries, vinegar, soap, and oil manufactories, tanneries, brick works, and agricultural-machine works. Pop. (1897) 13,449.

M.L.C., Member of Legislative Council.

MIle., Mademoiselle, Miss. MM., Messieurs, Gentlemen. Mme., Madame.

Mnemonics, a method of assisting one to recall the memory of any series of numbers or words. The 'decayed mental impressions' of the brain are revived if associated with others which are more readily recalled. In this association lies the whole art of mnemonics or 'mnemotechny.'

Cicero, for example, adopted the topical method when he wished to recall the successive parts of a long oration. Choosing some house with which he was entirely familiar, he associated every room and object with some detail of the speech, whether argument, illustration, or conclusion, proceeding in order from the porch and entrance-hall to the main parts of the building, and assigning the great divisions of his discourse to some of the principal apartments. It was easier to recall the successive parts of the house in proper order, and then set forth the corresponding thoughts and conclusions which had already been deliberately assigned to each, than to recall the latter at first hand. The art being largely ap-plied to the learning of disconnected names and figures by rote, as in grammar and formal logic, it incurred the satire of Lord Bacon, who compared such mne-monical skill to the gymnastic feats of rope-dancers.

There are at the present time two systems of mnemonics in use. The first is for remembering such numbers as dates in history and measurements in geography. For this purpose a code is prepared of the following type

(after Feinaigle)-

Each figure or digit should instantly suggest to the student the corresponding letter, as shown above. The date of the first crusade was 1095, which by the code gives dspl, suggesting the mne-monic word 'despoil,' or 'dis-The latter word may suit one who admires the crusaders, with the phrase 'display of chivalry;' the former would perhaps be adopted by those who regard some of the knights as more marauders. Vowels are, of are, of course, inserted anywhere and anyhow in order to devise a suitable word—i.e. a word easily remembered; and any letter oc-curring in the code is convertible into a cognate consonant. For d we may put t or th, for nput ng, for v put f or w, or wh, and k for g (hard), and also for guttural ch, yh, etc., according to the usual transformations in grammar. Columbus discovered America in 1492 = drpn, suggesting 'door open' to Europe for entering upon a new phase. The second system is suitable for recalling larger groups of digits, such as the ratio (see Circle) = 3.1415926536. This group is recalled by the sentence. Now I must a while endeavour to reckon right the ratios. Each word by the number of its letters shows the corresponding digit. To avoid division by π , it is important to remember its reciprocal $\left(=\frac{1}{\pi}\right)$ '3183.0, the

mnemonic phrase for which is, Can I discover the reciprocal? Other useful examples are the base of the Napierian logarithms, = 2718281828, and '4342944819, the multiplier for converting any Napierian logarithm into the ordinary one. The mnemonics for these groups are: So mindful, I theorize to remember, I theorize to remember; and, Read the page of Napierian lore, fine scholars, I inculcate. Perhaps the most famous mnemonic is that known as barbara celarent, used in logic. See Green's Memory, Natural and Artificial (1886); Fowler's Memory and Intellectual Improvement (1891); Ribot's Diseases of Memory (1882); Evan's Memory Training (1889); and Loisette's Assimilative Memory (1896).

Mnemosyne—i.e. 'memory'—in ancient Greek mythology a daughter of Uranus; by Zeus she was the mother of the Muses.

Moa (Dinornis), the native name for certain flightless birds which inhabited New Zealand, and are believed to have been exterminated by the Maoris, who were very fond of its flesh, about the middle of the 18th century. The largest species was about 12 ft. in height, but many were very much smaller, one being perhaps not bigger than a turkey. The head was small, the neck is believed to have been bare of feathers, the wings were very much reduced, or in some species wholly absent, but the legs were large and strong. The feathers were rounded, with disunited webs, and had a long after-shaft. The birds apparently fed on green shoots and roots of ferns. They lived together in pairs. The nearest living ally is the small apteryx.

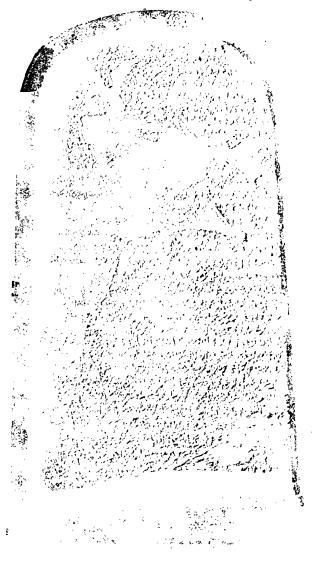
Moabites, a Palestinian tribe E. of the Dead Sea. They spoke a language closely akin to Hebrew, and their national deity was Chemosh. Their ancestor was Moab, son of Lot, and the story of Gen. 19:30-38 is intended to show their relationship with Israel. The two peoples, however, were at constant strife. Saul warred with them, and David forced them to become tributary. In the time of Ahab, Mesha, their king, revolted; and when Jehoram was endeavouring to reconquer them, and had shut Mesha up in Kirhareseth, the latter caused his son to pass through the fire—an act by which the Israelites were so awed that they forthwith raised the siege. Moab probably reached the acme of its prosperity c. 700 B.C., but it eventually disappeared before the Babylonian conquest. See Tristram's Land

of Moab (1873), and W. R. Smith's Religion of the Semites (1894). Moabite Stone, one of the

Moabite Stone, one of the most important epigraphic me-morials of Semitic antiquity, was unearthed at Dilon or Diban in

to chronicle his successful revolt against Israel. Seemonographs by Ginsburg (1871), Smend and Socin (1886), and Nordländer (1896).

Moallakat, a collection of ancient Arabic poems. See The



The Moabite Stone, in the Louvre.

1868 by the Rev. F. A. Klein. It is of black basalt, measuring 3'8 by 2 by 1'2 ft., and contains 34 lines in the Phemician character, purporting to have been inscribed by Mesha, king of Moab,

Seren Golden Odes of Pagan Arabia, known as the Moallakat, by Lady Anne Blunt, and in English verse by W. S. Blunt (1904); and ARABIA—Language and Literature.

Moberly, city, Randolph co., Missouri, U.S.A., 130 m. w. from St. Louis. Pop. (1900) 8,012. Mobile. (1.) City, Alabama, U.S.A., and co. seat of Mobile co., on Mobile Bay. It exports cotton, timber, and vegetables, and has iron foundries and cotton mills. Its total trade amounts. mills. Its total trade amounts to about £3,000,000 annually, four-fifths being exports. Pop. (1900) 38,469. (2.) River, Alabama, U.S.A., formed by the junction of the Alabama and the Tombigbee. It empties into the head of Mobile Bay (30 m. long, from 10 to 12 m. broad), just above the city of Mobile. Its drainage area is 43,436 sq. m. It is navigable to the junction of the Alabama and Tombighee. The entrance to the bay was gallantly forced by Farragut, in command of a Federal fleet, in August 1864.

Mobilier, CRÉDIT. See CRÉDIT MOBILIER.

Mobilization, the process of passing from the peace footing to that of war, a process in which rapidity is of the very utmost importance. It is a main point in modern war to be first ready, and to be beforehand with the enemy in striking. In 1859, Napoleon III. took thirty-seven days to place about 130,000 men in N. Italy. In 1866, 220,000 Prussians crossed the Austrian frontier within a fortnight from the beginning of their mobilization. In 1870, Germany mobilized 400,000 men in nine days,

and placed them on the frontier

in eight more.

The work of mobilization consists in bringing all units up to a war establishment by calling up reserves; clothing and equipping all reserves and recruits; providing the horses necessary all the stores and vehicles necessary for the army about to take the field; calling into existence corps for taking the place of those to go on active service; providing for all commands and employments vacated by those proceeding to the field; distributing all necessary munitions, and holding in readiness large reserves of them, as well as of clothing, food, and forage; securing the use of railways, shipping, and other means of transport; and preparing hospitals and medical services.



Moccasin, shoe of the N. American Indian. It varies much in

different districts-in some being made of soft leather, sole and upper all in one piece; in others, with a sole of raw hide, slightly turned up all round, and uppers of soft deerskin. Moccasins are often tastefully decorated with embroidery of coloured porcupine quills.



Moccasin Snake.

Moccasin Snake (Ancistrodon contortrix), a poisonous N. American snake (also called copperhead'), which is found in swampy localities, where it preys on small mammals and birds. It grows to a length of about three feet, and is of a brownish colour, with darkbrown and black markings.

Mocha. See MOKHA. Mocha Stones, pale translucent agates, which show branching brown or black patterns resembling mosses or fern fronds. They are used as brooch stones, and come chiefly from Arabia, but many of those now sold are produced by artificially colouring

natural agates.

Mock Heroic Poetry is that in which mean or trivial subjects are, for the purposes of satire or mere amusement, treated in the serious and elevated style proper to heroic or epic themes. It is a form of parody, and more or less synonymous with travesty or burlesque. The Iliad was burlesqued in the Batrachomyomachia, or Battle of the Frogs and Mice, once ascribed, though in error, to Homer himself. Chaucer parodied mediaval romance in Sir Thopas, and Beaumont and Fletcher parodied romantic drama in The Knight of the Burning Pestle. Amongst later examples may be named Charles Cotton's Scarronides, or Virgil Travesticd, Samuel Butler's Hudibras, the Duke of Buckingham's The Re-hearsal, and the play of 'The Spanish Armada' inserted in inserted in

Sheridan's The Critic. Mocking-bird (Mimus polyglottus), an American bird, belonging to the thrush family. which owes its popular name to its extraordinary capacity for imitating the notes and cries of other animals. It possesses also a song of its own, which is both strong and sweet. The plumage and flight are thrush-like, and the diet consists of insects and fruit. The range extends from the United States to Mexico and the Antilles. The name is also ap-

plied to other nearly related forms which forms which possess powers of imitation. similar

Mock Suns and Moons, or PARHELIA AND PARASELEINE respectively, are frequently seen in conjunction with halos. Occasionally supernumerary circles appear, and then mock suns and moons are observed near where the point of intersection with the primary halo takes place. The development of these phenomena is due to the more brilliant illumination at the points of intersection. The cause of mock suns or moons is attributed to refraction on ice crystals or spiculæ having their axes vertical. See HALO.

Mod, THE GAELIC. The word mod was borrowed into Gaelic from the Norse language. Originally it may have been used in the sense of 'meeting,' council,' but it was especially connected with the administration of justice. The word enters into topography: Tom a Mhoid is the Gaelic equivalent of 'moot' or 'mote hill,' 'gallows hill.' Later the term meant 'court,' 'assize.' The Comunn Gaidhealach or Highland Association was founded about fifteen years ago to pro-mote the study of the Gaelic language, literature, and music. A chief means of carrying out the objects of the association was the institution of an annual gathering, on the model of the Welsh Listeddfod and the Irish Oireachtas, where prizes are offered for excellence in Gaelic reading, recitation, literary compositions in prose and verse, choir and solo singing, and playing on the harp. The official title selected by the Highland Association for these gatherings is The Gaelic Mod. During the last thirteen years Mods have been held annually in autumn in Oban, Glasgow, Edinburgh, Inverness, Perth, Dundee, Greenock, and Dingwall.

Modder. See VAAL.



Mocking-bird.

Mode, in music. Ancient Greek music was founded upon a melodic system of diatonic scales termed modes. The ecclesiastical modes, fourteen in number, and said to have been classified into authentic modes and plagal modes by St. Ambrose and St. Gregory, differed in some respects from, but retained the names of, their Grecian prototypes. Each mode was an octave in compass, and contained two semitones, which occupied different positions in each scale. plagal mode was a fourth below the authentic, from which it was derived, and was indicated by the use of the prefix hypo to the name of the authentic; thusmixolydian, authentic; hypomixolydian, plagal. A composi-tion was said to be in a 'mixed' mode when its compass extended throughout both authentic and plagal modes. Rules were in use which regulated the trans-position of modes and substitution of certain notes. Two of the modes, the Locrian and Hypolocrian, were early rejected as impure; but all ancient ecclesiastical music was written in one or other of the remaining twelve modes. It was not until about the 17th century that these old modes were finally superseded by our present forms of major (equivalent to the Greek Lydian and the mediæval Ionian), minor (equivalent to the Greek and mediaval Æolian), and chromatic scales.

Models and Modelling. A model is an object to be reproduced by imitation. A model may represent a perfect type in-capable of reproduction, but furnishing an ideal aim; or, as in mathematics, something mentally conceived; or, as in foundries, the actual mould in which a bell is cast. Living persons are employed as art models in Rome, Paris, and elsewhere. In geography, globes, maps, and other representations; in sculpture, figures of plastic materials; in anatomy, reproductions of the human form; in mechanical science, machines; in pure mathematics and geometry, models constructed of papier-maché, are employed to present to the senses the precise form of figures and curves. Models of yachts, ships, theatres, and other tangible objects are habitually employed for the same reason. The largest collection of models exists in the New York Patent Office, where a model of each patent must be deposited. For modelling in plastic art, see Modelling, by Lanteri (1902).

Modena. (1.) Province, Italy; area, 1,002 sq. m.; pop. (1901) 315,804. The N. part belongs to o10,304. The N. part belongs to the valley of the Po; in the s. part rise the Apennines. (2.) Town, cap. of above, 25 m. N.w. of Bologna. The cathedral, with a marble tower, was commenced in 1099 by the Countess Matilda of Tuscany: while the release of Tuscany; while the palace, built by Francis II. in the 17th century, contains a valuable library. The town is the seat of an archbishop. Modena is exceptionally rich in churches, palaces, and public buildings. Woollen and hempen cloths, hats, and leather are manufactured. Under the name of Mutina, it became a Roman colon in 183 B.C., and during the civil war it sustained a siege of four months against Marcus Antonius, 43 B.C. After being devastated by the Huns under Attila, 452 A.D., it fell into a state of decay after the conquest of the Longobards, and only recovered some of its former importance under the Countess Matilda. In the cathedral is preserved the secchia rapita, or stolen bucket, which in 1325 led to a war between Modena and Bologna. In 1360 the town was plundered by the Hungarian partisans of Pope Innocent VI.; and in 1510 it was seized by Pope Julius II. In 1799 the Austrians were defeated by the French under its walls. Pop. (1901) 63,012.

Modica, tn., prov. Syracuse, Sicily, 31 m. s.w. of Syracuse. Pop. (1901) 49,951.

Modjeska, Helena (1844), Polish actress, born at Cracow. She married G. V. Modrzejewski (abbreviated to Modjeska), and issued a company (1861). Three joined a company (1861). Three years after her husband's death (1865), she married Count Bo-zenta-Chlapowski, and acted fre-quently at Warsaw. In 1876 she settled in America, and (1877) appeared in San Francisco with great success in an English version of Adrienne Lecourreur. She then visited London (1880), and the Continent, and retired from the stage in 1905. She excelled in Shakespeare's heroines.

Mödling, mrkt. tn., prov. Lower Austria, at foot of Wienerwald, 10 m. s.w. of Vienna; has manufactures of iron, railway supplies, and shoes. It has sul-phur baths, and is a popular Pop. (1900) summer resort.

Modocs, a N. American people, who, jointly with the kindred Lutuami, formerly dwelt on the frontiers of Oregon and Cali-fornia. They are the 'Klamath Lake People,' and the 'Rogues' of the early white settlers. After a general revolt in 1873, when most of them perished, the survivors were removed to the Klamath reservation in Indian Territory, where they numbered less than 300 in 1900. The Modocs speak a stock language, and possess traditions, myths, and animal tales, showing great imagination and even literary taste. Much of this literature was collected by Albert S. Gatschet in 1885. Specimens are given in the Jour. of American Folklore, vol. ii., No. 6.

Modugno, tn., Apulia, Italy, 51 m. s.w. of Bari. Pop. (1901) 11,979.

Modulation, the process of change from one key into another in a musical composition. At one time modulations were seldom made into other than nearly-related keys, but the adoption of the conjoined systems of equal temperament and enharmonic changes now gives almost unrestricted freedom to the practice of this device, and many of the greatest effects in modern music are produced by the fre-quent introduction of skilful modulations. See HARMONY.

Modulus, in mathematics, a constant referring to properties of matter in certain equations. As stress is proportional to strain within the elastic limits, some constant quantity may be introduced, making this proportionality into an equality. In dealing with strength of materials, such a constant is called a mod-ulus. Thus in Hooke's law, which says that extension, as of a bar, is proportional to the extending force, the constant which converts this proportionality into an equality is called the modulus of elasticity, or Young's modulus, and is denoted by E. Thus T = E (l'-l)/l, where T is the extending force taken as a tension (or compression), usually as pounds per square inch, E in lbs. per square inch, l the original length, and l' the final length. By putting l'=2l, it is seen that E is that force which would double the length of a bar of unit section if the material were capable of standing such a strain. Where the elastic limits are not exceeded, the transverse strain-i.e. the contraction per unit of transverse dimension—is from one-third to one-fourth the longi-tudinal strain. The symbol denoting the modulus of elasticity of bulk is K. It denotes the lessening of bulk per unit cube, usually per cubic inch, under hydrostatic stress. If p be the shearing stress, and s the shear strain, then p = Ns, where N is the modulus of rigidity. See Perry's Mechanics (1897). For values of the moduli, see also Molesworth's Pocket-book (25th ed. 1904).

Moe, Jörgen Ingebrektsen (1813-81), Norwegian author, born in Ringerike; acted as tutor, and spent all his spare time in col-lecting folk-tales in collaboration with his friend Asbjörnsen. The second edition of the Folkeeventyr (1852; Eng. trans. by Dasent, 1859) is provided with a luminous introduction by Moe on the origin and development of the folk-tale. He became pastor at Sigdal (1853), and in 1875 bishop of Christianssand. He also published some good lyr-ical poetry, and books for children. His Samlede Skrifter appeared in 2 vols. in 1877.

Möen, Danish chalk island, s. of Zealand. Area, 86 sq. m. Farming and fishing occupy the inhabitants. Pop. (1901) 13,535. The capital is Stege, on w. coast. Pop. (1901) 2,625.

Moris, Lake, sheet of water, N.w. border of prov. of Fayum, Central Egypt, with modern name Birket-el-Karun, 34 m. long by 4½ m. wide. The artificial lake, if it existed at all, lay probably s.E. of the present lake. See The Fayyum and Lake Mæris, by R. H. Brown (1892).

Mœro. See MWERU.

Mœsia, ancient Roman province, bounded by the Danube on N., the Black Sea on E., cor-responding to Servia and Bulgaria. It was conquered by Rome in the reign of Augustus, and afterwards divided into Mosia Superior (w.) and Mosia Inferior (E.). When Aurelian surrendered Dacia to the barbarians (272 A.D.), and removed its inhabitants to Mœsia, its central part received the name of Dacia Aureliani.

Moffat, par., bur. of barony (1635), police bur., Dumfriesshire, Scotland, 20 m. N.E. of Dumfries, on Annan R. It is a watering-place, and has mineral springs-c.y. Moffat Well, one and a half miles, and Hartfell Spa, five miles north-east. A hydropathic was built in 1875-77. Pop. (1901) 2,153.

Moffat, ROBERT (1795-1883), Scottish missionary, was born at Ormiston, E. Lothian. He set sail for S. Africa in 1816 as a missionary under the London Missionary Society. From Namaqualand (1818) he journeyed into the interior (1820), and founded the station of Kuruman, in Bechuanaland. Here he translated the Bible into the native tongue. From 1839-43 he was in England, and published his Labours and Scenes in S. Africa (1842). After his return to Kuruman (1843), he was assisted by Dr. Livingstone, who married one of his daughters. He returned to England (1870). See Lives of Robert and Mary Moffat, by John S. Moffat (12th ed. 1904).

Mofussil, term of Anglo-Indians, meaning 'the provinces.' It is applied to the country districts and stations as distinguished from the presidency; or relatively, in a country district, to the more rural parts as distinguished from the chief station.

Mogador, or Suera, chief seapt. of Morocco, on Atlantic, 130 m. s.w. of Morocco city. It is built on a rocky promontory, and exports olive oil, almonds, hides, gum-arabic, and wool. The imports in 1903 amounted to £286,461; the exports to £321,434. Pop. 20,000.

Mogdishu, or MAGADOXO, tn., coast of Italian Somaliland, E. Africa, between Cape Guardafui

and Juba R. Pop. 5,000. Mogila, Peter (c. 1596-1647), Russian prelate, born of a noble Roumanian family, was metro-politan of Kieff from 1632 until his death. He drew up the Confession of Faith of the Orthodox Greek Church in the East (1643).

Mogilev. (1.) Government of N.W. Russia. Area, 18,551 sq. m. The N. portion is traversed by a continuation of the Valdai heights, the water-parting between the basins of the Dnieper and the W. Dwina. The s. part is thickly-wooded, marshy lowland. Lakes are numerous, but small. Iron ore and clay are worked. Bees are extensively kept, and fisheries prosper. The chief industrial establishments are distilleries, breweries, oil works, flour and sawnills, paper works, flax and hemp mills, and iron foundries. Pop. (1897) 1,708,041. The mass of the people are White Russians. (2.) Often miswritten Mahilley and of the people are white Russians. Mohilev, cap. of above gov., on the Dnieper, 400 m. s. of St. Petersburg. It possesses a fine town hall (1679), Roman Catholic church (1692), containing a famous marble group of the Resurrection by Antokolski; an orthodox cathedral founded in 1780 by Catherine II. The Roman Catholic archbishop is metropolitan of all Roman Catholics in Russia. Leather, tobacco, and pottery are manufactured. Pop. (1897) 43, 106. . Russia, 87 m. E.S.E. of Kamenets, has distilleries, breweries, and tanneries. Pop. (1897) 22,093.

Mogok, vil., cap. of Ruby Mines dist., Upper Burma, 70 m. N.E. of Mandalay. Pop. 8,000.

Moguer, city, prov. Huelva, Spain, 6 m. s.e. of Huelva. It is a fine old Moorish city on the crest of a steep ridge, and has great production of wine. Pop. (1900) 8,455.

Mogul, the Arabic, as MUGHAL is the Persian, form of the word Mongol. The Mogul empire of Mongol. The Mogul empire of India (Delhi) was founded in 1526 by Baber, a descendant of Tamerlane, and came to an end in 1858, when the last of the dynasty was transported by the British government for complicity in the Indian mutiny. The emin the Indian mutiny. peror of Delhi was generally called the Great Mogul.

Mohács, mrkt. tn., Baranya co., Hungary, on r. bk. of Dan-ube, 25 m. s.e. of Funfkirchen. In 1526 the Hungarians were here defeated by the Turks. Another battle took place in 1687, in which the Turks were defeated by Charles of Lorraine. Pop. (1900)

Mohair. See Woollen Tex-

Mohammed (571-632), the founder of Islam, was born at Mecca, of which city his grandfather was the spiritual and tem-poral head. Early left an orphan, he was brought up by an uncle, Abu-Talib. Two factors influ-enced Mohammed's religious evolution—he was subject to epileptic fits, and was early brought into close intimacy with Arabian idol worship through the sacerdotal functions which devolved on his grandfather, and, after his death, on Abu-Talib. His youth was passed tending sheep and camels in the neighbourhood of Mecca. At the age of twenty-five he became the business agent of a widow named Khadija; his integrity and diligence won him her affection, and he married her when he was twenty-six and Khadija forty years of age. It is to this remarkable woman that Mohammed owed much of his success. Her wealth gave him a position of importance, and her devotion encouraged him to believe that he was indeed the apostle of God. For twenty-three years she was Mohammed's sole wife, but after her death, in 619, he married ten wives, besides owning concubines and female slaves. Political considerations and the early deaths of all his male offspring doubt-less influenced some of these alliances, but in two instances Mohammed's conduct is open to reproach. For a long time it was Mohammed's custom to retire, along with his faithful Khadija, for meditation and prayer to a cave on Mount Hira, about three miles N. of Mccca. Here his epi-leptic tendencies induced cestasies and visions which alarmed his wife, until one day, about his fortieth year, after a solitary visit, he told her that he had recoived from the angel Gabriel the first of those messages which were afterwards incorporated in the Koran. Instantly Khadija attached a new meaning to the strange visitations which had befallen her husband. Mohammed proclaimed the unity of the Godhead, condemned infanticide, murder, and idolatry. Towards Christians and Jews, in those early days, his attitude was one of conciliation and friendship. The development of the creed is dealt with under MOHAMMEDAN-ISM. The propaganda produced at first but slender results: at the end of five years Islam could not claim more than half a hundred adherents. Persistent persecu-tion at length drove Mohammed and his followers from Mecca; and it is this Hejira, or flight to Medina, in July 622, which marks not only the year from which the Mohammedan world computes its era, but the turning-point in the prophet's career. Cordially welcomed and hospitably entertained at Medina, it was from this city that he set out on those wars which resulted in the conquest of Mecca and the ultimate subjugation of Arabia to his rule. As time went on, Mohammed withdrew the concessionshe had made to those of other faiths. Growing power and success led to loftier claims; coercion was sanctioned when the means of exercising it were achieved; idolaters were to be persecuted. Yet it is a question how far his hands were forced by ficry zealots. In ten years from the Hejira Mohammed numbered his followers by thousands; and although his belief

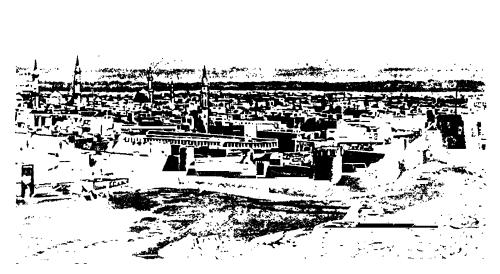
stantinople, which he made the capital of his empire. He conquered the rest of the Bulkan Peninsula except Belgrade, reduced the isles of the Ægcan Sea, and had designs on Italy.

and had designs on Italy.

Mohammed All (c. 1716-95),
nawab of the Karnatik, was Clive's
ally in the contest with Dupleix
in 1751. Known in England as
the 'Nabob of Arcot,' his debts
formed the subject of discussion
in Parliament and (1785) of a famous speech by Burke.

Mohammedanism, or the faith of Islam. For some time before the advent of Mohammed, Christian and Jowish missionary enterprise in Arabia had secured converts from pagan ranks, while

to be placed in time of adversity. There must be no murmurings at His decrees; life, your own and others dearer than your own, must be placed in His hands, in trust and love. The fatalism which has come to be regarded as part of the Moslem creed had no place in the system established by Mohammed, who again and again distinctly and emphatically repudiated the idea. Mohammed taught reform, not revolution. Although the idolatry of Arabia was polytheistic, the first part of a formula which has since become the watchword of the Mohammedan faith was but the echo of a prayer common enough among the pagan devenue.



Medina, where Mohammed is buried.

[Photo by Dr. Salih Subht.

in the divinity of his mission never failed, neither regal state nor personal ambition ever appealed to him. There is evidence that his last days saw a return of the magnanimity of his earlier years and a calm submission to the will of God. Mohammed was buried at Medina. See Sir W. Muir's Life of Mahomet (new ed., 4 vols., 1877), and Mahomet and Islam (1887); Nöldeke's Das Leben Muhammeds (1863); Ameer Ali's The Life and Teachings of Mohammed (1891); and Margoliouth's Mohammed and the Rise of Islam (1905).

Rise of Islam (1905).

Mohammed II. (1430-81), Sultan of Turkey, began to reign 1451, and in 1453 captured Con-

contact with those rival creeds had made thoughtful Arabs dissatisfied with their national worship. It was in the midst of such surroundings that from the cave at Hira there burst forth the awakening cry, 'There is no deity but God, and Mohammed is the messenger of God.' The striking parallelisms and allusions which are to be found in the Bible, the Koran, and the Talmud are due rather to Judaism than to the deprayed Christianity prevalent in Arabia in the century in which Mohammed lived. Mohammed taught that the Creator rules the universe with love and mercy; He alone is to be worshipped; in Him confidence is

otees at the Kaaba (or holy shrine in Mecca). Green, the favourite colour of the Arab race, became the emblem of the new faith; and with the establishment of Islam, Mecca retained its sanctity.

It was only natural that the chiefs of Mecca, who exercised sacerdotal functions, should resent the new teaching which throatened to deprive them of their revenue. Mohammed's cry was met by a storm of ridicule and a demand for a sign from heaven. The small band of devotees were at length driven to take flight to Medina. From Medina came reprisals. A guerrilla war resulted in the plunder

of rich caravans en route for the holy city. At length the exasperated Meccans joined with the Bedouins and organized an expedition against the Moslems. A series of sanguinary encounters terminated in the complete victory of the latter and the capture of Mecca.

Once Mohammed was safely established at Medina, there was a departure from the broad philanthropic lines of the original message. God, the loving Father, was transformed into a hard task-The power of success, master. the zeal of fanatics, and political considerations, while popularizing the creed, ultimately led to that exclusiveness, intolerance, and bigotry which have become such marked features of the faith of Islam. The 'Messenger of God' laid down a plan of salvation based on ceremonial law. Fasts and festivals were proclaimed; stress was laid on pilgrimages, and special blessings were attached to a pilgrimage to Mecca. Later revelation changed the attitude of the 'faithful' towards Christians and Jews from one of friendship and toleration to one of aggression and persecution. A holy war, in which a martyr's crown was held out as the reward of thos; who fell, was to be prosecuted against infidels. Captive women were condemned to slavery or concubinage; polygamy was not only countenanced but encouraged. Almsgiving, the condemnation of usury, and the prohibition against the use of intoxicants are the few redeeming features of a retrogression, in spite of which the creed spread until before Mohammed's death, in 632, all Arabia acknowledged his spiritual and temporal supremacy.

Mohammed left no son, and for the first twenty-two years after his death Arabia was governed by three successive caliphs— Abu-Bekr, the friend of Mohammed, a sagacious and pure statesman; Omar, the 'Prince of the Faithful;' and the benevolent and aged Othman. With the murder of the last-named in 654, the caliphate reverted to Ali, son-in-law of Mohammed, the 'Bayard of the Faith.' It is now we catch the first note of Mussul-man dissent. The church was rent into two great factions -- the Shiites and the Sunnites. The former look upon the three caliphs who reigned between Mohammed and Ali as usurpers; the latter recognize no divine right of succession, and claim for the 'faithful' free choice in the selection of their spiritual leader. Ali was assassinated in 660, and his eldest son, Hasan, who resigned in less than six months, in favour of his father's rival, was

subsequently poisoned by his wife. Then, in disgust at the licentiousness of the usurper, Ali's youngest son, Hosain, was invited to become caliph. Hosain set out from Mecca with his nearest relations to join his adherents on the Euphrates. On the plain at Kerbela his small band was surrounded and destroyed by 3,000 of the enemy. Hosain was buried where he was slain, and Kerbela has since become the necropolis of the Shiites—a second Mecca. Only one of Hosain's twelve children escaped this massacre, and it is through this man, Ali, surnamed Zayn-el-Abidin, that the pontiffs of what is known as the orthodox Mussulman church claim succession. The death of Hosain widened the breach between the rival sects, and on the Moharram-the days of mourning set apart to commemorate the martyrdom of Ali and his two sons-the Shiites and the Sunnites have often met in deadly conflict. There are other sections of the faith, of which the Sufis, Wahabis, and Dervishes, all treated of in separate articles, are the most important.

Mohammed himself wrote nothing. The Koran, the scripture of the creed, was compiled after his death. This book not only his death. embraces the whole gospel of Islam and its theology, but it also forms the basis of Moslem law and government; it is the final court of appeal for all Moslems. But the diffusion of Islam gave rise to complex religious, social, and administrative questions which the Koran did not solve; hence we have the Sunnat or 'traditional law.' The divine or traditional law. The divine law, or rule, had its place in the sacred book; the prophet's interpretation of the law is to be found in the Sunnat. But the collections of Sunnats, compiled by the Shiits and the Sunnites respectively, are not only at variance with one another, but often are antagonistic. To meet points on which both Koran and Sunnat fail to produce an exact pro-nouncement, reference is had to the lima, which may be briefly described as the dicta of the fathers of the faithful.' And lastly, there are the Kias-the reasonings or deductions to be gathered upon consideration of one or all of the three writings already referred to. These four books constitute the foundations of Moslem faith. Mohammed repudiated all intercession or atonement. Each believer was required to work out his own salvation; yet to-day at Mohammed's tomb and at the sepulchres of saints sacrifices are offered in order to draw upon the worshipper the mercy of the All-compassionate.

The history of the temporal triumphs of Islam is given under CALIF. See Dozy, Het Islamisme (1863; French trans. 1879); Aug. Müller, Der Islam im Morgenund Abendlande (1885-87); A. von Kremer, Geschichte der herrschenden Ideen des Islam (1868), and Kulturgeschichte des Orients unter den Khalifen (1875-77); L. Cactani, Annali d'Islam (1905, etc.); D. S. Margoliouth, Mohammed and the Rise of Islam (1905); T. W. Arnold, The Preuching of Islam (1890); Sell, Essays on Mohammedanism (1901).

Mohammera, Mohammarah, or Muhamrah, tn., Persia, on canal between Shat-el-Arab (Euphrates) and Karun. Since the opening of the Karun in 1889 to international navigation, its trade has considerably increased. The exports, which consist of dates, wheat, opium, wool, and horses, amounted in 1903 to £76,672; its imports to £168,173. Pop. 15,000.

Moharram, the first month of the Mohammedan year, but more popularly the period of mourning set apart by the Shiite Moslems for commemorating the martyrdom of Ali and his two sons, Hasan and Hosain. On the tenth day a preacher tells the pathetic story of Hosain's death.

Mohawks, N. Amorican Indians, the most renowned members of the Iroquois League. Their original home was in the N. of New York. They always sided with the English in the colonial wars, and after the revolution passed bodily into Canada. They are industrious agriculturists, Protestants, and fairly well educated. In 1900 they numbered about 1,800.

Mohawks, or Mohocks, a band of wild characters whose practice it was in 1711 and 1712 to parade the streets of London, and molest and ill-treat harmless pedestrians. See Spectator, No. 347.

Mohicans, N. American aborigines, an extinct branch of the Algonquin family, who shared the territory between the Atlantic coast and the Hudson R. with the kindred Naragansetts and Massachusetts. Their name survives in Cooper's Last of the Mohicans (1826). A few appear to have lingered on till 1880 in Connecticut.

Mohilev. See MOGILEV.
Mohl, HUGO VON (1805-72),
German botanist, was born at
Stuttgart. Appointed in 1832
professor of physiology at Bern,
he left there in 1835 for Tübingen.
He studied especially vegetable
anatomy and embryology. Chief
works: Ueber den Bau und das
Winden der Ranken und Schlingnfanzen (1827), and Ueber den
Bau und die Formen der PollenKörner (1834). Mohl was jointeditor of the Botanische Zeitung.

Mohl, JULIUS VON (1800-76), German Orientalist, was born at Stuttgart. Settling in Paris, he studied under De Sacy, and in 1826 was commissioned by the government to edit (1838-68) the Shāhnāma of the Persian poet Firdausi. For twenty-seven years he was connected with the Société Asiatique, of which he rose to be president. In 1847 he was appointed professor of Persian at the Collège de France. His widow issued his ossays as Vingt-sept Ans d'Histoire des Etudes Orientales (1879-80). See Mrs. Simpson's Letters and Recollections of Julius and Mary Mohl (1887).

Möhler, Johann Adam (1796-1838), German Roman Catholic theologian, was born at Igersheim in Würtemberg. In 1823 he became professor of theology at Tübingen, and in 1835 he was transferred to Munich. articles published in a Tübingen journal brought him into prominence as an independent thinker. His principal book is Symbolik (1832; Eng. trans. 1843), which gave rise to much controversy. He also wrote The Life of St. Anselm (trans. 1844), and Athanasius der Grosse (1827). His Gesammelte Schriften und Aufsätze were published by Dr. Dollinger (1839-40). See *Lives*, in German by Friedrich (1894) and Knöpfler (1896), and in French by Goyau (1905)

Mohn, HENRIK (1835), Norwegian meteorologist, was born at Bergen. In 1860 he accepted a post in the observatory at Christiania, and in 1866 was appointed director of the Central Meteorological Institute of Norwegian Sea. Amongst his works are A Storm Atlas (1888); The North Ocean (1887); Grundzüge der Meteorologic (1875; 5th ed. 1898); and part of vol. vi. of Scientific Results of the Norwegian North Polar Expedition of 1893-6 (1905).

Mohun, CHARLES, FIFTH BARON MOHUN (1675-1712), English duellist, was tried at seventeen for murdering a man in a drunken brawl, but acquitted. In 1698 he was again tried, for the murder of Captain Coote, and again acquitted. In 1712 he challenged the Duke of Hamilton, and both combatants were mortally wounded. The incident is mentioned in Thackeray's Esmond.

Moldore, a gold coin formerly current in Portugal, but no longer in use. It was also known under the name of lisbonine, and was equal in value to 4,800 reis, or about 27 shillings English.

Moir, DAVID MACBETH (1798-1851), Scottish physician and author, known as Delta, was born

at Musselburgh, where he spent the whole of his professional life. Many of his verses appeared in Blackwood's Magazine. Besides poems, he wrote The Autobiography of Mansie Wauch (1828; new ed. 1895), and a work on The History of Medicine (1831). Moiræ, or THE FATES, called in Latin Page, were the god

Moiræ, or The Fates, called in Latin Parcæ, were the goddesses who presided over human destinies. The goddess Moira—
Homer knows only one—is conceived as spinning a thread at each man's birth. Hesiod names three Moiræ, the daughters of Night: Clotho, who spun the thread of life; Lachesis, who mixed in it weal and woe; and Atropos, who with her shears cut it through at the appointed time for death. Later writers hold that even Zeus and the other gods had to submit to them. In art the Moiræ are sometimes represented as old and hideous, but more often as grave maidens.

Moiré, also called watered silk, a substantial make of silk which is figured by boing wetted, folded in a particular way, and then submitted to great pressure by hydraulic machinery; this pressure slowly expels the air and draws the moisture into waved lines, which remain as a permanent pattern on the fabric. Woollen materials are sometimes watered, and are called moreen.

Moissac, tn., dep. Tarnet-Garonne, France, on Tarn R., 15 m. N.W. of Montauban. The church of St. Pierre, built in the 12th century, is a unique edifice, with a remarkable porch. Pop. (1901) 8,407.

Moissan, HENRI (1852), French chemist, was born in Paris. He became demonstrator in School of Pharmacy, afterwards holding the chair of toxicology. till appointed professor of chemistry at the Sorbonne in 1900. He gained a seat in the Academy of Sciences in 1891. Moissan's work includes the isolation of fluorine, and a thorough investigation of its compounds; an application of the electric furnace to prepare refractory ele-ments like uranium, chromium, tungsten, and vanadium, in massive and coherent specimens; to prepare diamonds artificially; and to study the carbides, silicides, borides. His principal publications include Le Fluor et ses Composés (1900), and The Electric Furnace (Eng. trans. 1904).

Moianga. See Majunga.

Mojl, seapt. tn., N. of Kiushiu, Japan, opposite Shimonoseki. Its nearness to extensive coal deposits has led to its rapid rise. Much of the export trade has been transferred from Nagasaki to Moji. Total foreign trade, about £750,000 annually. Pop. (1901) 25,274.

Mojos, or Moxos, the collective name of a large number of S. American tribes, gathered in the missions about the Mamoré and Beni rivers, Bolivia. The oldest station is Loreto, founded about 1674 by the Jesuit Cypriano Baraza, 'apostle of the Moxos.' They have become industrious agriculturists, and have acquired several arts, and are skilful boatmen. They number over 30,000.

Mokaddasi, SHAMS ED-DIN AL (946), Arab geographer, born at Jerusalem. He travelled for twenty years, and wrote an account of the countries under Moslem sway, which is very valuable. See his Syria and Palestine, ed. by Guy Le Strango (Palestine Pilgrims' Text Society, 1997)

Mokanna. See AL-HAKIM-IBN-

OTTO.

Mokha, or MOCHA, fort. seapt., former cap. of Yemen, Arabia, on Red Sea, 55 m. N.W. of the Strait of Bab-el-Mandeb. Most of its former trade in coffee now passes through Hodeida. Pop. 5,000.

Mokshani, or Mokshansk, tn., Penza gov. Central Russia, 25 m. N.W. of Penza city, has manufactures of potash, woollen cloth, and ropes. Pop. (1897) 10,072. Mola di Bari, seapt. tn.,

Mola di Bari, seapt. tn., Apulia, Italy, 12 m. s.E. of Bari. Pop. (1901) 14,490.

Mola di Gaeta. See FORMIA. Molasses, or TREACLE, is the uncrystallizable syrup obtained in the boiling down of raw sugar. It contains about 70 per cent. of sugars, and when it comes from sugar-cane syrup, is about half cane sugar and half invert sugar, and is a thick, sticky, dark-brown semi-liquid. It is also obtained in the manufacture of beet-sugar.

Molbech, Christian (1783-1857), Danish scholar, born at Sorö; became (1829) professor of literary history at University of Copenhagen, and wrote Historie om Dithmarskevr Krigen (1813); Kong Erik Ploppennings Historie (1821); Videnskabernes - Selskabs Historie (1843); Dansk Ordbog (1833); Dansk Dialekt - Lexikon (1833-41).

Molbech, Christian KNUD FREDERIK (1821-88), Danish poet, son of the above, born at Copenhagen. His chief plays include Ambrosius (1878) and Dante (1852); and his poems Digtninger (1845), Fra Danäidernes Kar (1873), and Efterladte Digte (1888). His translation of the Divina Commedia is the best in Danish.

Mold, mrkt. tn. and parl. bor. (with Flint), Flintshire, Wales, 11 m. s.w. of Chester, with coal mines, lead mines, and limestone quarries. The church of St. Mary dates from the 15th century. Pop. (1901) 4,263.

310

Moldau, riv., Bohemia, Austria, rises in Bohemian Forest, and flows s.E., then N., past Prague, until it unites with the Elbe. Length, 270 m., navigable from Budweis to the Elbe.

Moldavia. See ROUMANIA.



Mole (Talpa curopæa), a member of the Insectivora, though the natural diet consists chiefly of carthworms. According to the observations of a recent observer (Mr. Lionel Adams), no such regularity of construction of nest and burrows is actually observable as was asserted by Henri de Court. There is always a 'bolt-run' leading from the central nest, but the galleries vary greatly in number and direction. Molehills do not indicate the position of the nest, which is usually placed in a shel-tered situation, but are formed by the animal as it excavates in search of food. The close, dense fur is admirably fitted to prevent abrasion of the skin by particles of soil while burrowing. The body is long and narrow, the tail short, the fore limbs placed far forward, while the hand is broad, powerful, and armed with five strong claws. There is no external ear, and the eye is minute. Among the many peculiarities of the skeleton the sternum (breast-bone), which is keeled anteriorly, extends far forward into the neck region, carrying with it both the collar-bone and the humerus. The hind limbs are relatively weak, and are so modified as not to impede the rapidity of the burrowing movements. are excessively voracious animals, and are said to die of starvation in from ten to twelve hours if food be withheld. They are also very pugn.eious, and in captivity the stronger frequently kill and de-vour the weaker. The European mole extends across the continent of Asia, and other species of the same genus also occur in both Europe and Asia, but not in America. For the marsupial mole of Australia, see MARSUPIALS.

Molé, MATHIEU, COMTE (1584-1658), French statesman who, during the minority of Louis XIV. and the troubles of the Fronde, upheld the authority of the queen regent, while firmly maintaining the rights of the Paris Parlement. He was made attorney-general in 1614, and first president of the Parlement in 1641. See De Barante's Vie de Mathieu Molé (1859).

Molech, or MOLOCH, the tribal deity of the Ammonites, and probably identical with the sungod. The name was originally Melek, 'king;' probably the form Milcom was also primitive. Little is known about his worship, but probably the sacrifice of children as burnt offerings was characteristic. Solomon introduced the cult into Israel, and erected an altar on the Mount of Olives (1 Kings 11:5 f.); and under Ahaz and Manasseh children were passed Tophet in the valley of Hinnom (Jer. 7:31 f.; cf. Lev. 18:21). By some it is held that the name Molech was understood by the Israelite worshippers as an epithet of Jehovah, and that the reproaches of the prophets were really directed against the practice of child sacrifice (Jer. 19:5). Molech appears also in Malik (Babylonian deity), Mel-kart (Tyrian), Milk-Astart (Syrian). See Schultz's Old Testament Theology, i. 233 f.; Baudissin's Studien zur semitischen Religion (1876-78).



Mole Cricket.

Mole Cricket, an orthopterous insect which occurs rarely in Britain, and that only in the south, but which is very common in South and Central Europe. It is related to the true crickets, but is adapted for a subterranean life. The body may reach a length of two inches, and is densely clothed with a soft pubescence. Both wings and wing-covers are present; but the insects fly but little, and only at night. The anterior legs are modified into organs for the excavation of the burrow. being short and broad, and bent so as to offer a marked resemblance to the hand of the mole. The insects are found in moist ground, usually in meadows or gardens, and seem to be chiefly carnivorous in diet.

Molecule, from the chemical point of view, the least possible quantity of an element or compound that can exist free-i.e. possess the properties of a mass

of the substance. In composition molecules vary from single atoms (as in the case of argon or gaseous mercury; pairs of similar atoms, such as oxygen or hydrogen; or pairs of different atoms, in compounds such as hydrogen chloride) to arrangements of every degree of complexity, culminating in molecules such as silicic acid, starch, or albumen, which in all probability contain many hundreds of atoms. In all cases the individual molecules are ultramicroscopic, their sizes being best realized from Kelvin's illustration, that if a drop of water were magnified to the dimensions of the earth, the molecules would be between the size of small shot and cricket balls. The questions, however, of the relative weights, and the disposition of the atoms in molecules, are much more important than their actual dimensions, and can be ascertained with considerably more certainty. foundation of the method of attacking the problem is given in the hypothesis of Avogadro, that equal volumes of gases contain equal numbers of molecules—a postulate that receives ample support from both the chemical and the physical behaviour of matter in the gaseous state. This being so, a determination of the relative density of a gas gives at once the relative weight of molecules compared with those of hydrogen. Now from considerations depending partly on their chemical behaviour and partly on physical properties, such as the ratio of the two specific heats of the gas, hydrogen molecules are very reasonably understood to consist of two atoms each; so twice the ratio of the weight of a molecule of a gas to that of a molecule of hydrogen (which is the same as the gas density) gives its molecular weight—i.c. the sum of the weights of the atoms in it. Thus, the gas density of benzene is about 39, so that its molecules are about thirty-nine times as heavy as a molecule of hydrogen, or seventyeight times as heavy as an atom. Now, benzenc contains, as shown by analysis, carbon and hydrogen in the proportion of 12 to 1: and as the carbon atom is believed to be twelve times as heavy as the hydrogen atom, therefore the two kinds of atoms will be present in the molecule in equal numbers, and the weight of the smallest possible molecule will be 12+1= 13. But the total weight of the atoms in the molecule is 78; hence their number will be 78 ÷ 13 -i.e. 6 of carbon and 6 of hydrogen. This process of determination originally applied only to matter in the gaseous state; but it has since been shown by Van t' Hoff that substances in dilute solution are in a state closely comparable to that of a gas, so that Avogadro's hypothesis may also be applied to them. This generalization has greatly widened our knowledge of molecular structure, as mo-lecular weights are deducible from the measurements of the osmotic pressure and its effect on the vapour pressure, freezing and boiling points of solutions of not only volatile but non-volatile substances, equal molecular weights producing equal depressions of freezing-point for any given solvent. For pure liquids measurements of the surface tension give some information as to their molecular weights as compared with each other, though not with that of substances in the gaseous state; but beyond this we are almost entirely ignorant of the complexity of the molecule both in pure liquids and in solids, though behaviour on replacement chemically yields some, but not certain, information. The disposition of the atoms in the molecule—that is to say, its structure -is arrived at by a study of the reactions of the substance. Thus, for example, we believe that in nitro-methane the methyl group is united through the nitrogen atom to the oxygen thus, CH₃NO₂, because on treatment with nascent hydrogen the nitrogen remains attached to the methyl, forming methylamine, CH₃NH₂, and the oxygen is removed as water. On the other hand, in methyl nitrate the oxygen appears to be the intermediate atom thus, CH3ONO, as on reduction the nitrogen is removed as ammonia, and the oxygen remains attached to the methyl, forming methyl alcohol, CH₃OH. Investigations of this character have been carried out with very many compounds, and not only have afforded information as to the particular atoms that are attached to each other, but, in accordance with a theory worked out by Van t' Hoff, that the carbon atom is situated at the centre of a regular tetra-hedron, at the angles of which the other atoms or groups of the molecule are attached, have made it possible to decide the relative position of atoms in space. though in the above account the atoms in the molecule have been described as being 'united' or 'attached,' it must not be imgined that the union is a mechanical joint or material bond. (See VALENCY.) From the point of view of the physicist, the term molecule is of somewhat wider molecule is of somewhat wider signification than that given above, and would include, for example, any particles whose motion according to the kinetic theory explains the properties of matter. See Gases—Kinetic Theory of, and Vapours. Molenbeek, tn., prov. Brabant, Belgium, a N.W. suburb of Brussels. It has machine works, and manufactures textiles, carpets, soap, and margarine; dye-works, and tanneries. Horticulture and market-gardening are carried on. Pop. (1900) 58,445.



Mole Rat.

Mole Rat (Spalax typhlus), a rodent, recalling theinsectivorous mole in its habits and appearance. The great mole rat of S. Europe, W. Asia, and N. Africa has soft fur, minute eyes covered by skin, rudimentary ears, powerful claws, rudimentary tail, and strong projecting incisor teeth. It burrows after the fashion of the true mole, but for bulbs and roots in place of worms. Allied forms occur in Asia and Africa

Asia and Africa.

Moleschott, Jakob (1822-93), Dutch physiologist, born at Boisle-Duc; lectured at Heidelberg (1847-53); settled in Italy in 1861, and was soon afterwards naturalized an Italian. He was professor of physiology at Turin (1861), and at Rome (1878). He published the results of his physiological researches in Untersuchungen zur Naturlehre des Menschen und der Tiere (16 vols. 1856-93), and wrote Kritische Betrachtung von Liebigs Theorie der Pflanzenernährung (1815), Physiologie der Nahrungsmittel (2nd ed. 1859), Der Kreislauf des Lebens (5th ed. 1875-6), and Lieht und Leben (3rd ed. 1879). See his Für meine Freunde — Lebenserinnerungen

Moleskin, a strong, tough cotton material, exceedingly durable, and on that account formerly much used by working men, especially those engaged in outdoor work. It is woven on a strong warp as a satin twill, and is usually white or drab, though occasionally printed with an imitation tweed pattern.

tation tweed pattern.

Mole St. Nicolas, tn., Haiti,
on N.W. peninsula, commands the
Windward Channel between Haiti
and Cuba.

Molesworth, SIR GUILFORD LINDSEY (1828), English engineer, was born at Millbrook, Hampshire. He rose to be consulting engineer to the government of India (1871). His best-known work is A Pocket-Book of Engineering Formulæ (25th ed. 1904). He has also written on bimetallic currency and economic subjects.

currency and economic subjects.

Molesworth, Mrs. (Mary
LOUISA STEWART) (1839), English
author. Her first work was a

novel, published under the pseudonym of Ennis Graham. Under this name she published five or six more novels; but in 1878 she produced Grandmother Dear and Hathercourt Rectory under her own name, which she has since continued to use. Her stories for children are charmingly written, always dainty, and in some cases genuinely pathetic. Her chief works are Lover and Husband (1869), and six other novels; The Adventures of Herr Baby (1881); Carrots (1876); Tell Me a Story (1875); Hoodie (1882); Hermy (1881); The Boys and I (1883); French Life in Letters (1889); and Peterkin (1902).

Molesworth, SIR WILLIAM (1810-55), English statesman, was born in London. He entered the House of Commons in 1832, representing E. Cornwall. He held Liberal opinions, and voted for the emancipation of the Jews and for the ballot. From 1841-5 he devoted his time to the study of conomics and to editing the works of Hobbes. He was keenly interested in colonial matters, and in 1855 was given an appointment in the Colonial Office.

Molfetta, seapt., prov. Bari, Apulia, Italy, 15 m. N.w. of Bari. Its commodious harbour is sheltered from all winds except the west. The principal exports are wine, almonds, olive oil, and nitre. Pop. (1901) 40,641.

Mollère (1622-73), who is to

French comedy what Corneille and Racine combined are to tragedy, was born at Paris, his father, Jean Poquelin, being purveyor of furniture to the court of Louis XIII. The boy's real name was Jean Baptiste Poque-The boy's real lin, the other being assumed as his stage designation on becoming an actor. In December 1643, in partnership with Joseph, Madeleine, and Geneviève Béjard, delene, and Goneview Digital, he definitely adopted the career of an actor. Compelled by finan-cial difficulties to leave Paris, the company for upwards of ten years toured in the provinces eg. at Bordeaux, Nantes, Tou-louse, Agen, Angoulême, Limoges, and Narbonne. The chief result of this provincial peregrination was that it revealed to Molière his true métier. Many of the plays represented were insufferably poor, and audiences eagerly called for something fresh. Molière, like Shakespeare, began to touch up the pieces, then to recast them, finally to write short farces. All these took well. At last in 1653, at Lyons, the actor-manager sat down and wrote *L'Etourdi* ('The Blunderer') almost at a sitting. Its success was instant and great. In this year also Molière was invited to play before his old schoolfellow, the Prince de Conti. So delighted was the latter with

both the play and the players that he assigned to them a pension of a thousand crowns. Molière produced at Béziers his second great comedy, the Dépit Amou-reux (1656), which achieved a triumph quite as pronounced as its predecessor. At Rouen he renewed his early friendship with Corneille, many of whose tragedies his company were in the habit of representing. In 1658 Molière decided to return to Paris; and having obtained the patronage of Philip, Duke of Anjou, the king's only brother, the company began their existence as a metropolitan troupe in the Petit Bourbon, near the old Louvre. Molière in 1659 pro-duced the famous Les Précieuses Ridicules ('The Affected Young Ladies'), which literally took Paris by storm. In the following year the theatre at the Petit Bourbon was pulled down; but Molière, until his new house was completed (1661), was invited by the king to occupy the great hall of the Palais Royal, and in the same year Louis conferred on him once more his father's position of valet tapissier de chambre du roi. Molière now took the step which was to cloud all his remaining years. In 1661 he married Armande Béjart, sister of the 'leading lady' in his company. The union was far from happy. Meantime he was producing his great comedies, as well as his farces and ballets, with a rapidity which, considering the high standard of excellence they almost all attain, is only paralleled by Shakespeare. Among the more important are Syana-relle, ou le Cocu Imaginaire (1660); L'Ecole des Maris ('The School for Husbands,' 1661), wherein the timeworn topic of hoodwinking elderly and paternal wooers is felicitously treated. This was followed in 1662 by its counterpart, L'Ecole des Femmes ('The School for Wives'), which provoked a storm of criticism— Corneille taking part against Molière, while Boileau defended him. Six months later (June 1663) Molière took his revenge on the critics in his laughable farcical comedy, Critique de l'Ecole des Femmes, following it up with the equally amusing piece, Le Mariage Forcé, in which the evils of the marriages made by parents are pointedly satirized. Then came one of his greatest plays, Then if not his greatest, the immortal Tartuffe, in which the despicable nature of hypocrisy is powerfully portrayed. So bitter was the ridicule, and so keen were Molière's enemies to suppress it, that only the first three acts were allowed to be played, and for five years it was only given in the private houses of the nobility. Another study in hypocrisy followed in Le Festin de Pierre, or Don Juan (1665), which was also bitterly criticised. In June 1666 was produced Lc Misanthrope, which from then till now has generally been regarded as his greatest play, though many competent critics prefer Tartuffe or Le Bourgeois Gentilhomme. Certainly the characters of Alceste, the misanthrope. and Célimène, the society-reputation-killer, are powerfully conceived and most artistically worked out. Un Médecin malgré lui ('A Doctor in spite of him-self') was also brought out in 1666, and for the next two years a succession of brilliant farces and ballets pleased the public taste, of which Mélicerte, Le Sicilien, and Amphitryon are the most notable.



Then came George Dandin and L'Avare (the latter adapted from Plautus), both belonging to 1668, and early in 1669 Tartufe was at last allowed to be produced in its entirety. The inimitable Bourgeois Gentilhomme was received with unflagging popularity in October 1670, followed by Les Fourberies de Scapin') in May 1671, and Les Femmes Savantes ('The Blue-Stockings') in 1672, the last named being another bitter satire on feminine affectation of culture. In February 1673 one of his finest comedies, Le Malade Imaginaire, was produced, in which Molière, though evidently very ill, appeared as Argan, and achieved a magnificent success.

Molière ranks but little below Shakespeare in comedy. The gallery of his dramatic portraits embraces almost every social class and well-nigh every professional calling pursued in his day. With an almost preternatural faculty

for seizing upon the salient attribute in any character, he possessed a happy gift of emphasizing that without exaggerating it. and thereby throwing the trait out of natural proportion. For wide knowledge of human nature, artistic skill in portraiture, profound acquaintance with stage technique, keen satiric wit, and genial humour, Molière has no rival in the literature of his own land. The standard edition of his works in French is that in Les Grands Ecrivains de la France (13 vols. 1873-96); in English, that by Van Laun (1875-77). See Life by Despois and Mesnard prefixed to the works in the former edition; also those by Taschereau (4th ed. 1851), Trollope (1905), and Hatton (1905).

Molina, Luis (1535-1600), Spanish theologian, was born at Cuenca in New Castile. He joined the Jesuits at an early age became a teacher at Evora, and eventually professor of morals at Madrid, where he laboured till his death. In 1593 he published vol. i. of his De Justitia et Jure (vol. ii. 1609); he also wrote a commentary on the Summa of Aquinas, a book which brought him fame. But his most outstanding work was his Liberi Arbitrii cum Gratia Donis... Concordia (1588). In this Molina attempts to reconcile the Pelagian view of free will with the Augustinian doctrine of the divine decree. He teaches that God gives sufficient grace to all men to enable them to win eternal life; that some accept and some reject; and that God's foreknowledge of either course constitutes the basis of Molinism formed His decree. the chief subject of debate at the Congregation of 1598; the final outcome was that the two sides were ordered to preserve the peace of the church. It is still taught in the Jesuit schools. See PREDESTINATION.

Molina, Thirso de. See Tirso de Molina.

Moline, city, Rock Island co., Illinois, U.S.A., on the Mississippi, 165 m. w. of Chicago. It manufactures wagons and agricultural implements. Pop. (1900)

Molinier, Guillem, Provencal writer, lived in the 14th century, and was chancellor of the literary academy of the Gaya Sciensa at Toulouse. He wrote a Poetics of Provençal poetry, under the title of Flors del yay saher (or, as it is more generally called, Las Leys d'Amors), which he finished about 1350. It is invaluable for our knowledge of the troubadour poetry. It was translated by D'Aguilar and D'Escouloubre, and edited by Gatien-Arnoult in his Monumens de la Littérature Romane (1841).

Molinos, MIGUEL DE (1640-97), Spanish ascetic and mystic, was born at Patacina, near Saragossa, and settled as a priest in Rome in 1669. His Guida Spirituale (Eng. trans. 1885) is in a line with the works of St. Theresa and St. Francis of Sales. The marvellous success of the book roused the antagonism of the Jesuits, but the friendship of Pope Innocent XI. protected the author for a time. But in 1687 Molinos was condemned as a disseminator of Quietism, and sentenced to close imprisonment for life. See MYSTICISM, QUIETISM; and Bigelow's Molinos the Quietist (1882).

Molique, WILHELM BERNHARD (1802-69), German violinist and composer, was born at Nuremberg, and in 1820 became first violinist to the court, and director (1826-49) of the court concerts, at Stuttgart. Subsequently he settled in London as music teacher and player at concerts (until 1866). He composed five concertos for the violin, one symphony, a mass, and an oratorio.

Molise, Italy. See Campo-

Mollendo, port of Peru, 50 m. s.w. of Arequipa. Borax, copper, and silver, sheep, vicuña wool, and coco leaves, are exported to the value of nearly £700,000 annually. Pop. 2,200.

Möller, Paul Martin (1794-1838), Danish author, born near Veile; visited China (1819) as a ship's chaplain, and wrote during the voyage his best-known poem, Glæde over Danmark (1826-31); was professor of philosophy at Christiania. His best works are a romance, En Dansk Students Eventyr, and the play Eyvind Skaldaspiller. His collected works appeared as Efterladte Skrifter (1839-43). See Andersen's Paul Möller (1894).

Möller, PETER LUDVIG (1814-65), Danish author, born at Aalborg; wrote collection of poems, Lövfald, under the pseudonym of Otto Sommer (1855), and the excellent critical work Det nyerc Lystspil i Frankrig og Danmark (1858). He spent the last fifteen years of his life at Paris, and died in a madhouse at Rouen.

Mollusca, a large series of invertebrate animals, which includes such forms as snails and slugs (gasteropods), oysters and mussels (lamellibranchs), the pearly nautilus and the cuttles (cephalopods). It was to the cuttles that the name Mollusca was applied by Aristotle. Linnæus applied the name to a very heterogeneous group of organisms, which included the shellloss Mollusca, together with a number of other unrelated forms, equally devoid of external shell. Cuvier, as a result of numerous

anatomical investigations, first showed the unimportance, from the systematic point of view, of the absence or presence of a shell, and defined the characteristics of the Mollusca as a class. Since then the limits of his sub-kingdom Mollusca have been narrowed by the removal of certain groups which he regarded as aberrant molluses. These are, first, Cuvier's class of Cirrhopoda, including the acorn-shells and barnacles, which subsequent research has shown to be modified Crustacea; second, the Brachiopoda, or lamp-shells, which are related to worms, though still often popularly confused with molluscs; third, the sea-squirts, or tunicates, called Nuda by Cuvier, which are now known to possess the characters of vertebrates. A character which at once distinguishes the mollusc from an arthropod or an annelid is the absence of segmentation and of appendages. Certain archaic molluses do, it is true, show signs of having been descended from segmented ancestors, but these signs are not necessarily obvious exter-More important to the nally. systematist than the shell is the mantle, or downgrowth of skin from the dorsal surface, which gives rise to the shell. This is seen in its simplest form in the common limpet, where it hangs down like a fringe round the animal, just within the shell. It is always single in the gasteropods or univalves, but, like the shell, is double in the bivalves or lamellibranchs. Whether single or double, it lines a space known the mantle cavity, within which the gills or breathing organs usually lie; but in some molluses shell, mantle, and gills may all alike be absent. In almost all molluses the muscles of the body-wall are greatly developed on the under surface, and protrude to form an organ called the foot, which is primarily con-The cerned with locomotion. foot varies greatly in shape and appearance in different molluscs, and may be suppressed. typically contains an important gland, which in the snail secretes the trail of mucus that the animal leaves behind as it creeps, and in the mussel forms the attaching threads (byssus) which fix the animal to the sea-bottom. Except in lamellibranchs, the food-canal contains in its anterior region a very peculiar structure, called the odontophore. This consists of a ribbon (radula), set with small teeth, which works backwards and torwards over the tilaginous cushion placed in the buccal cavity. The wards and forwards over a carmouth or buccal cavity. radula is renewed behind, as it wears away in front, and constitutes a very efficient rasp, capable in the case of carnivorous forms of boring a hole through the shell of another mollusc.

The nervous system is very peculiar, though along its own line it reaches in the higher forms a degree of specialization greater than that found in any other invertebrate. There are three main pairs of nerve-knots or gangliathe cerebrals, supplying the head region; the pedals, sending nerves to the foot; and the pleurals, supplying the sides of the body. These ganglia are connected by threads or commissures, and there are usually less important accessory ganglia. In lamellibranchs, where the head region is undeveloped, sense organs are few; the most important is the osphradium, or smelling-patch, which lies at the base of the gills. In the other molluses the head usually bears eyes, and there are often tactile tentacles, as well as otocysts or ear-sacs, which also occur in lamellibranchs. In the cuttles the eye reaches a very high degree of specialization, and along its own lines is as complex as the vertebrate eye. excretory organs are modified nephridia, opening internally into the cavity of the pericardium, which represents the remains of the primitive body-cavity. reproductive organs vary almost infinitely; many molluscs are hermaphrodite, and the organs are then markedly complex. The life-history typically includes a metamorphosis, but of this all trace is lost in the specialized cuttles. In many other molluscs two larval forms occur, one of which is the top-shaped larva called the trochosphere, which also appears in the life-history of annelids; while the other, known as the *religer*, is peculiar to molluses. The veliger is a pelagic form, capable of swimming by means of the velum; in the case of the more stationary forms it must be of great importance in the distribution of the species, and is thus in a sense comparable to the winged seeds of forest trees. As in the case of other animals, the development becomes direct in fresh-water and terrestrial forms.

Mollusca are typically marino animals, and in the ocean live all known cuttles; of lamellibranchs there are many freshwater forms, while gasteropods have succeeded in many instances in successfully colonizing, not only fresh water, but also the land. All the lamellibranchs are water-breathers, but some fresh-water gasteropods have lost their gills, and have converted their mantle cavity into an airchamber or lung. Such forms, of which the pond snail (Limnœus) is an example, may be said to

lead up to such terrestrial forms as snails and slugs. These, again, show their descent from aquatic ancestors by their extreme susceptibility to drought, active life being entirely dependent on the presence of some degree of moisture. The diet is very varied. Many gasteropods are vegetarian; many others are, however, actively carnivorous, feeding upon other molluscs. The cuttles are all carnivorous. The lamcllibranchs feed on minute organisms

Molluscs are very widely distributed over the globe. Owing to the presence of the shell in most cases, they are very abundant as fossils, the fossil forms often showing beautifully the gradual development of special forms of shell—c.g., in the am-

filtered from the water.

The classification of molluses has recently undergone considerable modifications. Five classes are now recognized as follows:-(1) Amphineura, including some primitive forms, of which Chiton is the most familiar; (2) Gasteropoda, including all the snail-like forms, as well as a great number of shell-less types; (3) Scaphopoda, a small and aberrant group, of which Dentalium is the most familiar form; (4) Cephalopoda, or cuttles; (5) Lamellibranchs, or bivalves. Of these the Amphineura are the most primitive; and in that they display certain signs of segmentation, as well as many other primitive characters, they suggest an origin from annelid worms. The early gasteropods probably arose from ancestral types similar to the Amphineura; while the lamellibranchs and Scaphopoda seem to have arisen from the primitive gasteropod stock. With the exception of Nautilus, the living cuttles are highly specialized; but Nautilus in several respects shows indications of segmentation—a proof that it also is descended from an annelid stock.

Economically the Mollusca are of considerable importance. A large number are used for food, and enormous numbers of shells are often found in kitchen mid-To civilized man their chief value is as bait or as food to other animals. Not a few lamel-libranchs give rise to pearls, while many species produce valuable pearl-shell. See 'Mollusca,' by Professor Ray Lankester, in Zoological Articles (1891); Woodward's Manual of the Mollusca (2nd ed. 1866); 'Molluscs,' by A. H. Cooke in the Cambridge Natural History (vol. iii.). British forms are discussed in Forbes and Hanley's History of British Mollusca (4 vols. 1853) and Jeffrey's British Conchology (3 vols. 1863-9).

Molly Maguires, an Irish secret society which established a reign of terror in the coal regions of Pennsylvania, U.S.A., in 1854-77. The name had previously been adopted by a branch

314

ton's The Molly Maguires (1877) and Dewees's The Molly Maguires (1877).

Mollymauk, a name given by sailors to one of the fulmar petrels.



Types of Mollusca.

1. Amphineura: a, Chiton marmoreus; b, C. lævis; c, C. cinercus. 2. Gasteropoda: a, Arion hortensis; b, Limax flavus; c, L. cinerco-niger; d, Paludina vivipara (frea start); c, Lechenopus pes-pelicani (marine); f, Helix arbustorum, and g, H. nemoralis (land). 8. Scaphopoda: Dentalium tarentinum. 4. Gephalopoda: Eledone moschatus. 5. Lamelibranchs; a, Pectunculus inequalis; b, Lunulicardia retusum; c, lacardia cov; d, Dione dibranch; c, hana senegalensis. 6. Details of Structure: A, Bivalve; a, univalve; m, mantle; og, outer gill; sq, inner gill; f, foot; c, entrance to breathing sac. 7. Types of Teeth; a, Helix asperwa; b, Succinea pueris; c, Litterina littorea.

of the Ribbonmen in Ireland, who used to disguise themselves as women. The society was brought to an end by the conviction and execution of its leaders in 1876-7. See PinkerMoloch (Moloch horridus), a curious lizard found in Australia, of great ferocity of appearance, an effect due to the sharp spines with which the body is covered.

Moloch. See Molech.

Molokai, one of the Hawaiian Is., Pacific Ocean, between Oahu and Maui; has been set apart as a leper settlement. It was the scene of Father Damien's work. Its area is 261 sq. m.

Molossi. See Epirus.

Molteno, Sir John Charles (1814-86), S. African statesman, was born in London, and at seventeen he sailed for the Cape. He supported the struggle for responsible government, and was the first premier of the colony (1872); but in 1878, finding himself hopelessly opposed to Sir Bartle Frere's policy, Molteno retired from public life. See Life and Times of Sir John Molteno (1890)

Moltke, Helmuth Karl Bernhard, Count von (1800-91), was born at Parchim in Mecklenburg-Schwerin. In 1835-6 he was sent to reorganize the armies of the Porte, and he narrowly escaped with his life in the battle of Nisibis (1839). The fruits of his experiences appeared in the very able Der Russische-Türkische Feldzug 1828-29 (1835). In 1857 Moltke was made chief of the general Prussian staff. With the help of his colleague, Von Roon, he probably trebled the real force of the Prussian army by largely augmenting the contingent of recruits, and by making the Landwehr, a bad militia, an effective reserve; more than this, he adapted the military system of Prussia to the new conditions of war which had been forming since the peace of 1815. Decentralization throughout the service, perfect preparation to take



Count von Moltke.

the field, the arrangement of the Prussian railway system for war, an immense improvement in the constitution of the staff, and the securing of ability in superior commands—these were the fruits of the genius and labours of Moltke at this time. The powers of this great instrument were first tested in the Danish campaign of 1864, and were made conspicuous in the contest with Austria in 1866. Moltke practically directed the operations in

armies, and not in their direction in the field. See Militarische Werke Moltkes (ed. Prussian general staff, 1892 f.); Lives, by Morris (1894) and Herms (1892), in English; and by Buehner (1895) and Jähns (1900), in German; Dressler's Moltke in his Home (Eng. trans. 1906); and Letters



Moluccas, or Spice Islands.

the field, and largely contributed to the success of the Prussians on the day of Sadowa. operations gave proof of decision and insight: he cut off Benedek, after the victory, from Vienna by a very skilful movement. But he exhibited one of his characteristic defects in the field: he repeatedly lost touch with his defeated enemy. When the war with France broke out in the summer of 1870, the assembling of the hosts of Germany, directed by Moltke, was perhaps the finest example of military organization ever beheld. In this war Moltke's strategy deserves, in some respects, high praise, especially in the combination that led to Sedan; but it was by no means so per-fect as his flatterers have said. His operations around Metz, he frankly acknowledged, were by no means without faults and shortcomings. Moltke has been described by his countrymen as 'the great strategist;' but his real title to renown is in the organization and preparation of of Moltke to his Mother and Brothers (trans. 1891).

Moluccas, or Spice Islands, that part of the E. Indies which lies between Celebes and the w. of New Guinea. They are 43,864 sq. m. in area, and consist of two main groups, the N. including Jilolo, Ternate, Tidore, and the Obi group; the s., Buro, Ceram (Sirang), Amboyna, and the Banda Is. The Kei and Aru groups lie to the s.E. Amboyna is the principal town and the chief commercial centre. Amboyna I. has long been noted for cloves, and Banda for nutmegs. Spices are an important production. See separate articles on the larger islands. Pop. (1900) estimated at 430,855.

Moluccella, a genus of annual plants belonging to the order Labiate. The hardy Syrian species, M. Levis, is the one usually cultivated in Britain, a light soil being desirable. The flowers are densely arranged in whorls on upright stems, the cup-shaped calyxes being longer than the

white corollas within.

Molybdenum (Mo, 96'0), a brittle, gray metallic element (sp. gr. 8'6), occurring chiefly in the somewhat rare mineral molybdenum glance, MoS₂. It is prepared by reduction of its oxide by aluminium, and has its most important compound in the oxide MoO₃, from which the molybdates are derived. Ammonium molybdate is used as a test for phosphoric acid, and sodium molybdate for producing blues on china.

Molyneux. See CLUTHA.
Molyneux, WILLIAM (1656-98),
Irish mathematician and philosophical writer, was born in Dublin, where, in 1683, he founded the Dublin Philosophical Society of England (1685). From 1692 until his death he represented Dublin University in the Irish Parliament. His chief works are Dioptrica Nova (1692), Sciothericum Telescopicum (1685), and The Case of Ireland (1698)

of Ireland (1698).

Molza, Francesco Maria (1489-1544), Italian poet, was born at Modena, and led a loose life at Rome (where he served the cardinals Ippolito de' Medici and Alessandro Farnese) and at Bologna. His Latin poems are very elegant; but his Italian pieces are empty imitations of Petrarch, with the exception of the exquisite pastoral, the Ninfa Tiberina, which sums up all the preceding examples of this genre in Italy. See Life by Scrassi in the Poesie Volg, e Lat. di F. M. Molca (1747).

Mombasa, seapt. and cap. of British E. Africa Protectorate, on E. side of Mombasa I. The Uganda railway runs from Mombasa to Port Florence, on the N.E. corner of Victoria Nyanza (584 m.). Mombasa dates from the end of the 15th century, when the Portuguese acquired it. In 1904-5 the value of the imports was £518,143, and the exports £234.664.

Momein, or TENG-YUEH, tn., prov. Yün-nau, China, about 250 m. N.E. of Mandalay. Pop. about 6,000.

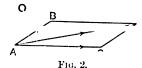
Moments. The moment of a force about a point is the product of the force and the \perp^r distance



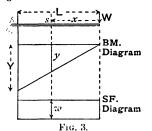
Fig. 1.

from the point to the line of action of the force; hence the moment of AB about 0 is twice (Fig. 1) the area of the Δ OAB. The same idea applies to any quantity which may be represented by a directed line. A very im-

portant proposition in moments is Varignon's theorem—viz. that the sum of the moments of two forces about any point in their plane equals the moment of their resultant about the same point.



Let the conterminous sides of the parallelogram (Fig. 2) represent a velocity and its change. If the direction of the change pass through o, its moment about o is zero. Hence, for acceleration directed to a fixed point, the moment of the velocity about that point is constant. If a number of forces act on a body tending to rotate it about an axis, there will be equilibrium if the sum of the moments tending to turn it counter-clockwise



(positively) be equal to the sum of the moments tending to turn it cum-clockwise (negatively). Simple examples of this are the lever and the wheel and axle. The same principle gives the supporting forces in cases of loaded beams and trusses.

MOMENT OF MOMENTUM about an axis, the product of the momentum and the perpendicular distance from the axis, is more usefully expressed as the product of the moment of inertia and the angular velocity.

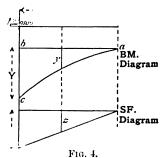
TURNING MOMENTS.—When a body is being rotated about an axis against a force—c.g. flywheel against a friction brake—there is a turning moment (measured as above) producing the motion which, in the steady state of the above fly-wheel, becomes equal to the frictional moment.

BENDING MOMENTS (B.M.).—The moments of the forces which tend to bend a loaded beam at any section are frequently found graphically. See GRAPHIC STATICS.

Cantilever with a Concentrated Load at the End.—The hending moment at any section is the product of the load and the distance from it to the section. At any sections the B.M. = Wx (Fig. 3).

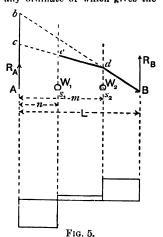
Set this off vertically as y. Then the BM diagram is a triangle, as $y \sim x$. Also Y = WL. SF = shearing force = constant = W.

Ing force = constant = w. Cantilever with a Uniformly Distributed Load (Fig. 4).—w per foot run—i.e. w = w/L. At any section $s \text{ BM} = y = \frac{1}{2}x \times w = \frac{1}{2}vx^2$, and $x = \frac{1}{2}wL^2$. Thus the BM dia-



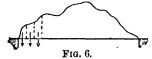
gram abc is bounded by a parabolic arc. Shearing force SF at s=cx=z, a straight line. So the SF diagram is a triangle, and z=wL=w.

Beam Supported at the Ends and Loaded with Concentrated Loads (Fig. 5).—Find, by taking moments about A and then about B, the reactions R_A and R_B at the supports A and B. Check $R_A + R_B = \text{sum of loads}$. Set up $Ab = R_B \times L$, and form the BM \triangle by joining Bb. Set down $bc = W_2 \times m$, and join cd. Set down cA as check $= W_1 \times n$, join Ac. Acd B is the BM figure, any ordinate of which gives the



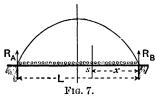
BM at the section to scale. Shearing force:—In space BS₂, SF = R_B. In space S₁A₂, SF = R_B - W₂. In space S₁A₃, SF = R_B - W₂ - W₁. This gives a stepped figure, the exact dimensions and heights of which

depend, of course, on the values and positions of the loads. It is important to note also that the tangent of θ , the inclination of the boundary of the BM dia-



gram to the horizontal, is also a measure of the SF. For in the section s_2B tan $\theta = ds_2/s_2B$, where ds₂ is the BM at s₂. Hence SF (in this case R_B) is represented

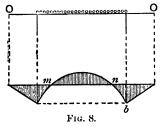
Beam anyhow Loaded.—Let the load diagram be shown by the irregular figure (Fig. 6). Break this up, as shown by the dotted lines, into small concentrated loads. each acting through its c.c., and then apply the above method. The BM and SF diagrams will both be irregular curves. A particular case of this is when the beam is supported at the ends and uniformly loaded.



Uniform Load (Fig. 7). - Then RA $= R_B = \frac{1}{2}W = \frac{1}{2}wL$. BM at $S = R_B \times x$ $-wx \times 1x = 1wx (L-x)$, a parabola; at the centre, where x = L/2,

maximum BM = $\frac{wL_2}{8}$. If rise < $\frac{1}{8}$ span, the parabola may be approximated to by drawing a circular arc, and the error in using this is slight.

Beam Loaded and Strained over Supports (Fig. 8). - Change of base line. Set off the B.M. diagrams for the two cantilevers; join ab, and on it, as a new base-line, construct the B.M. curve shown, as if for



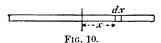
a detached span. The actual B.M. diagram is shown shaded; m and n are points of contra-flexure at which the curvature of the beam changes, and at which the B.M. is zero. If the points of contraflexure be known, the continuous girder or built-in beam may be considered as composed of cantilevers and detached spans.

Rolling Loads on Bridges.-In simple cases the maximum bending moment and shearing force curves may be found analytically. They may also be found by drawing the B.M. and S.F. curve for successive positions of the load and taking the maximum values, but there are quicker methods by using tracing paper.



Moments of Inertia of a body about an axis (Fig. 9).—Let the body be supposed broken up into a number of very small elements. Multiply each little mass m by the square of the \mathbb{L}^r distance rfrom the axis: the sum of these is the moment of inertia 1. Its value, $I = \sum mr^2$, may be found by squared paper (see GRAPHS) or by integration.

Radius of Gyration.—If $I = Mk^2$, where M is the mass of the body, then k is a length known as the radius of gyration. Moments of inertia are very important in dynamics.



Examples. - Uniform rod of length 2a and density ρ . Find I about Lr axis through its centre.

$$I = 2 \int_{0}^{a} x^{2} \rho \, dx = \zeta \frac{2a^{3}}{3} = M \frac{a^{2}}{3},$$

M being the mass. A rectangle may be looked upon as being built up of such rods, whence the proposition $I = M \frac{a^2}{3}$ still holds, in the case of a rectangle about an axis through its centre Lr to a side of length 2a, and in the plane of the rectangle. Circular area of radius a about axis 1 plane and through its centre-

$$1 = \int_0^a r^2 \, 2 \, \pi r \, \rho \, dx = \zeta \, \frac{\pi a^4}{2} = M \frac{a^2}{2}.$$

The cylinder, being built up of thin circular laminæ, $I = M\frac{a^2}{2}$ holds for it also about its axis.

Fundamental propositions:—(1.) If M be the mass of a body, and I the M.I. about an axis through I the M.I. about an axis through the C.G. of the body, and I' the M.I. about a parallel axis at distance h, $1' = 1 + Mh^2$; hence $K^2 = K^2 + h^2$. (2.) If A and B be the M.I.S of a lamina about the two axes at ∠rts, ox, oy, in the plane of the lamina, and c the M.I. about the axis o z, at ∠ rts to ox and oy, then c = A + B; hence $K_1^2 = K_A^2 + K_B^2$.

Applications to various figures: Rod about an axis through one

$$\mathbf{I}' = \mathbf{M} \frac{a^2}{3} + \mathbf{M} a^2 = 4 \frac{\mathbf{M} a^2}{3}.$$

end \perp^r to its length 2a (by I)— $1' = \frac{m^2}{3} + \frac{Ma^2}{3} + \frac{Ma^2}{3}.$ Circle about diameter 2a (by

Circle about diameter
$$2a$$
 (by II), $C = A + B$; but $A = B - C$

$$\therefore C = 2A = \frac{Ma^2}{2}. \quad \therefore A = B = \frac{Ma^2}{4}.$$
Circle about axis in its plane distant h from each re-

distant h from centre-

tant h from centre—
$$1' = 1 + Mh^2 = M\left(\frac{a^2}{4} + h^2\right).$$
Rectangle (2a, 2b) about a

Rectangle (2a, 2b) about axis through C.G. \perp^{r} to its plane— $C = A + B = M\left(\frac{a^2}{3} + \frac{b^2}{3}\right).$

$$C = A + B = M(\frac{a^2}{3} + \frac{b^2}{3}).$$

(Tables of moments of inertia for various figures are given in text-books of mechanics.) At every point of every rigid body there are three principal axes of inertia at right angles to one another, and hence by a proper selection of axes it is possible to make products of inertia disappear. For further dotails, see text-books mentioned under Dynamics, Graphic Stat-

Momentum, the dynamic quantity which is measured by the product of the mass of a body and its velocity. It is a directed or vector quantity. the case of a system of particles, the momentum of the whole is equal to the vector sum of the momentums of the parts. Also, as implied in Newton's third law of motion, the momentum of a material system cannot be changed by the action of the forces be-tween its various parts. This important principle is known as the 'conservation of momentum. The moment of momentum is treated under MOMENTS

Momerie, ALFRED WILLIAMS (1848-1900), English divine, of Huguenot descent, was born in London. He was appointed professor of logic and metaphysics at King's College, London, in 1880, and morning preacher at the Foundling Hospital in 1883. His latitudinarian views led to the resignation of both posts. He subsequently preached on Sundays at the Portman Rooms, London. His chief work is Religion of the Fatters and Other Francisco of the Future, and Other Essays (1893), written in an extremely brilliant and effective style.

Mommsen, Theodor (1817-1903), German historian, was born at Garding in Schleswig-Holstein. After spending three years in France and Italy in the collection and examination of inscriptions for the Berlin Academy of Sciences, he acted as editor of the Schleswig-Holsteinische Zeitung; and in 1848 became professor of jurisprudence at Leipzig, from which office he was expelled in 1850 for the part which he had taken in the politics of the preceding revolutionary years. years later he became professor of Roman law at Zurich, in 1854 professor of the same subject at Breslau, and in 1858 professor of

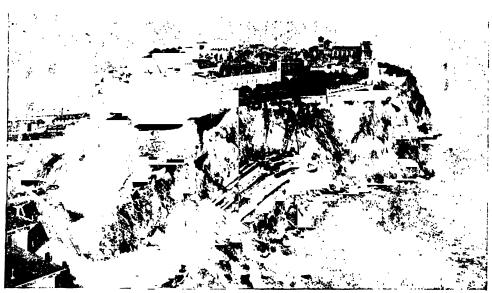
the march of civilization. His greatest work is his History of Rome (1853-6; Eng. trans., new ed. 1894), covering the period from the earliest times to 46 B.C.; supplemented by Provinces under the Empire (1887). As a historian he is unequalled for the range of his knowledge, and for his grasp of detail and his vivid presentation of facts. He is less successful in his insight into political situations, as he is often misled by modern analogies, and into human character: his worship of Casar, and his depreciation of Pompey, Cato, Cicero, and others, are notorious. Though a democrat, he was

Momordica, a genus of tropical, climbing, herbaceous plants belonging to the order Cucurbitace. They bear large white or yellow unisexual flowers, the female ones being followed by fleshy, baccate fruits, which burst into valves when ripe. They are sometimes grown in stove-houses as annual plants. They require rich soil and a trellis up which to climb.

Momostenango, tn., Guate-mala, Central America, 65 m. N.W. of Guatemala. Woollen cloth is manufactured. Pop. (1899)

18,000.

Mompos, formerly a flourishing seapt. in dep. Bolivar, Colom-



The Principality of Monaco: General View.

ancient history at Berlin. While holding this position he edited the Corpus Inscriptionum Latinarum, and also undertook the publication of part of the Monumenta Germaniæ Historica. In 1873 he was appointed secretary to the Berlin Academy of Sciences, which post he held until 1895. From 1873 to 1882 he was a member of the Prussian House of Representatives. During the Boer war his acceptance of the current calumnies against the British troops won him un-popularity in Britain, which will hardly be removed by his appeal, made a few months before his death, to England to stand side by side with Germany in heading

an admirer of the strong ruler. His chief works are Oskische Studien (1845); Die Unteritalischen Dialekte (1850); Corpus Inscriptionum Neapolitanarum (1851); Die Rechtsfrage zwischen Cäsar und dem Senat (1857); Geschichte des römischen Münzwesens (1860); Die römische Chronologie bis auf Casar (1858); Römische Forschungen (1864-79); Res Gestæ Divi Augusti, an edition of the so-called Monumentum Ancyranum (1865); Das Römische Staatsrecht (1893); while with Marquardt he brought out the Handbuch der römischen Alter-thümer (1881-8). His Gesämmelte Schriften began to appear in 1904. See Life by Bardt (1903).

bia, on Magdalena R., no longer navigable at this point, 110 m. s.E. of Cartagena. Pop. 10,000.

Mona, the Roman name of the isle of Anglesey, also of the Isle of Man.

Monachism. See Monasti-

Monaco, rocky peninsula and coast strip in S. Europe, 9 m. E.N.E. of Nice. It is 8 sq. m. in area, and is an independent principality. In 1861 the communes of Mentone and Roccabruna (Roquebrune) were ceded to France by Sardinia, the prince receiving an indemnity of 4,000,000 francs.

Monaco is the seat of a Roman Catholic bishop. Olive oil, oranges, citrons, perfumes, and

liqueurs are exported. The mild climate and the picturesque scenery make it a favourite tourist resort; but the main attraction is the casino of Monte Carlo. Monaco, the capital, and Condamine are the only other places of any importance. Originally a possession of the house of Grimaldi of Genoa, Monaco, in 1450, came under Spanish rule, and in 1641 was taken under the protection of France. In 1793 France annexed it, but by the treaty of Paris (1814) it was restored to

Monad and Monadism. Monadis the technical term used by Leibniz to designate the ultimate elements in his metaphysical theory of reality. It must be sharply distinguished from the atom; for while the atom was conceived as extended yet indivisible—a metaphysical contradiction—the monad is a nonspatial qualitative entity. The atom is negative and characterless; the monad is a world in itself, a unity within whose diverse content the whole universe is

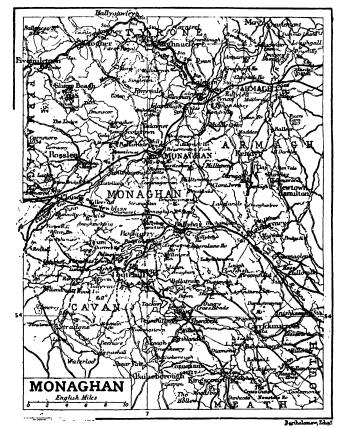
Tyrone border (1,254 ft.). Agriculture is the general industry, and some linen is manufactured. The county returns two members to Parliament. The chief town is Monagham. Arca, 500 sq. m. Pop. (1841) 200,500; (1901) 74,611. (2.) Assize and co. tn. of above co., on Ulster Canal, 12 m. w.s.w. of Armagh. Nearitis the Roman Catholic cathedral of St. MacCartain. Pop. (1901) 2,932.

Monarchianism, a name given to the tenets of those who, before and during the 3rd century A.D., opposed the rapidly developing doctrine of the Trinity as endangering or violating the monar-Chia (unity and supremacy) of God. They are usually divided into two classes:—(1.) Dynamistic or Adoptionistic Monarchians (sometimes erroneously called Ebionistic), who regarded Jesus as a human personality, influenced and 'adopted' by the Father. The principal representatives of this view were the Alogi, who rejected the Revelation and Gospel of John as inculcating the doctrine of the Logos and the Paraclete; Theodotus and his followers—e.g. Artemon, who opposed the incarnation, and held that the divine dignity of Jesus was derived from the descent of the Spirit at His baptism; also Paul of Samosata. (2.) Modalistic or Patripassian Monarchians, who rationalized the Trinity as but the various modes in which God revealed Himself-c.g. Noëtus, who taught that Christ Himself was the Father; his pupil Epigonus; Praxeas, who, in Tertullian's words, both expelled the Paraclete and crucified the Father; and especially Sabellius, who regarded the Trinity as the three prosopa (persons or modes) of the one indivisible God. Beryllus of Bostra was converted from Patripassianism by Origen.

Monarchy. See SOVEREIGNTY. Monarda, a genus of hardy N. American herbaceous plants, belonging to the order Labiatæ. Some of the species are worth growing as garden plants, and are of the easiest culture. Perhaps the most useful is M. didynu, the Oswego tea, which bears bright scarlet flowers in late summer and autumn. The wild huramout in M. figurear

wild bergamot is M. fistulosa.

Monastery. The first monks were solitaries; but when St. Pachomius organized them (c. 340) into communities, it became necessary to provide them with a habitation and a rule—hence the monastery. The Oriental monk was originally without tonsure or special frock; he merely polled his hair shorter than the fashion, and wore the pallium. These irregularities came to an end in the monastery, where the most stringent rules of obedience



the Grimaldis, and placed under the protection of Sardinia. In 1860 it again passed under French protection. Pop. (1900) 15,180. ALBERT, PRINCE OF MONACO (1848), succeeded his father, Prince Charles III., in 1889. For his concession to Monte Carlo, see that article. He is interested in scientific questions, and has done much useful work in sea-dredging in his yacht. See Métivier's Monaco et ses Princes, Pickering's Monaco (1882), and article MONTE CARLO.

mirrored. The term monadism is sometimes used in a wide sense as the opposite of monism, and thus in much the same meaning as pluralism, and then includes all theories which, like that of Leibniz, assume a plurality of ultimate elements—e.g. the system of Herbart.

Monad, a name given to certain Infusoria.

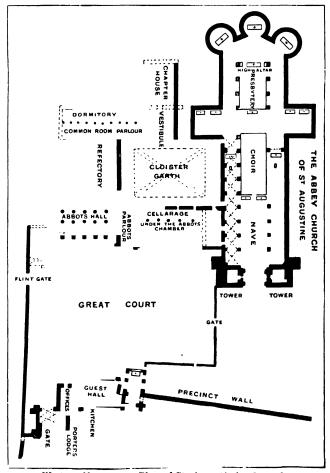
Monaghan. (1.) Inland co., prov. Ulster, Ireland. The surface is hilly or undulating, highest in the Slievebeagh Mts., on

and uniformity were exacted from all. The best-known rules are as follows:—The rule of St. Pachomius, the founder of the comobitic system (292 A.D.); the rule of St. Basil: the rule of St. Augustine. for nuns (contained in his 109th letter); the rule of Casarius of Arles (542 A.D.); the rule of St. Isidore of Seville (d. 635 A.D.); and the Scottish rule of St. Calumbe (for which was Skare). Columba (for which see Skene's Celtic Scotland, vol. ii, p. 508).

The life of each monastery differed not only according to its rule, but according to national temperament and the character of the abbot. One description runs: 'The Irish monks had so little to do with their brethren in the same monastery that there is some doubt whether they had even a daily meal in common. Each passed his days and nights in his own little beehive-shaped clayhann, or cell, constructed of slabs of stone fitted without mortar; the entrance so low as to necessitate the inmate crawling on his knees, the passage so tortuous as to serve as a protection against the winds rushing in. In no case was a single large church provided' (Barnard's Middle (Barnard's Ages, 1902). Compare this with Dean Church's description of the Benedictine monastery of Bec, in Normandy, in the 11th century, condensed (St. Anselm, ch. iii., 1895): 'A monk's life was eminently a social one: he lived night and day in public, and the cell seems to have been an occa-sional retreat. The cloister was the place of business and conversation, the common workshop, study, and parlour of all. Here the children learned their letters; here was the lecture-room. In a cloister like this the news, the gossip of the world and of the neighbourhood, was collected; rumours and stories were reported, picturesquely dressed up and made matter of solemn morals or of grotesque jokes, as they might be now in clubs and newspapers.' Widely apart as these two habits of life may seem, the object of the monastic rule was in every case the same. Dean Church says: The governing thought of monastic life was that it was a warfare, militia, and a monastery was a camp, a barrack; there was continual drill and exercise, early hours, fixed times, appointed tasks, hard fare, stern punishment, obedience prompt and absolute.

In a general way, at the head of each community was the abbot. Theoretically he was chosen by the brethren; practically he often was nominated by high outside patronage. He exacted an obedience which no other kind of autocrat has ever been able to enforce. The smallest hesitation in obedience of the most literal kind was sharply punished. Next in rank came the precentor. only regulated He not the choral services, but was libra-rian and master of the processions. The next officer was the cellarer, who managed the domestic affairs of the house, and was in many ways a more powerful person than the office seems to suggest. There was also someplate; and the chamberlain was responsible for dormitories, cloth-

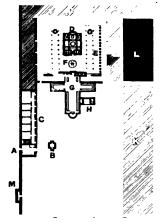
The architectural plan of a monastery differed in East and West. The ground plan of the Eastern monasteries was always rectangular, with the catholicon, or church, as the central object about which gathered the cells. The monastery of Santa Laura, on Mt. Athos, is a typical ex-



A Western Monastery-Plan of St. Augustine's, Canterbury.

times a treasurer, if the cellarer did not undertake the duties of the post. The sacristan had charge of the sacred vessels, and kept the keys of the church. The almoner was an important functionary, whose duty was to find out cases of poverty and to re-lieve them. The kitchener, in-firmarer, and porter all had their respective duties clearly defined. The refectioner had care of the

ample; as also are the Coptic monasteries of Upper Egypt, which are the least altered now in existence. The Irish and Scottish monasteries of the 6th and 7th centuries, as at Armagh and Iona, followed the Eastern model rather than the Western. In all Western monasteries the church was prominent, usually cruci-form. The refectory, where the monks shared their common meal, was provided with a desk, from which a novice might read aloud during dinner. The chapter house was a place of great importance. Every one assembled there each morning. All the business of the community was carried on there: disputes were settled, accusations heard, and punishment (often corporal) was publicly administered. Distinguished strangers were invited to address the brethren in the chapter house. The dormitory was the public sleeping-place, and was used for the midday rest as well as at night. Many of the cloisters were extremely beautiful, their arches opening upon lawn or garden. The infirmary had a chapel adjoining it, and sometimes a garden for the use of the sick. The guest hall was often of great size;



An Eastern Monastery—Santa Laura, Mt. Athos.

a. Gate: n. chapel: c. guest rooms; D. church; E. cloister; F. fountain; O, refectory; n. kitchen; J. cells; K. outhouses; L. postern; M. tower.

that at Canterbury was 150 ft. in length. The locutory, or parlour, was a room set apart for conversation when silence was enjoined in other parts. The almonry was so placed that distribution could be conveniently made to the crowds of daily dependants. In the library and scriptorium were stored and prepared those wonderful works of the penman's and illuminator's art. The miscricord was a chamber where special indulgences in food could be enjoyed. The song school speaks for itself. In the mint and exchequer coins were cast, known as 'abbey pieces.' Thecells were not commonly used, except in cases of severe discipline. The granges, a term now applied to the manor-houses, once meant the farms with which monasteries were endowed.

Similar establishments for women are termed convents or numeries, and at the head of each community is the mother superior or reverend mother.

Monasticism arose in the East. Its origin is undetermined, but at a very early date recluses began to shut themselves out from the world and live in solitary retirement (Cassian, bk. v. ch. 36; Socrates, bk. iv. ch. 23). Among these shadowy names Paul of the Thebaid stands out with some distinctness (Cassian, bk. xi. ch. 24). The historian Socrates describes the impetus which was given to this movement in the 3rd century by Ammon. This man, being prevailed upon to marry, persuaded his bride that chastity was the highest form of earthly existence; and they both renounced a secular life, living apart, in the exercise of abstinence and prayer. Ammon found many imitators, and the wastes of Nitria and Scetis were soon filled with monks. Of these the best known are the two monks Macarius, one from Upper Egypt and the other from Alexandria. Among their disciples was Evagrius, a friend of Gregory of Nazianzen, who wrote several books on monks. A translation of Athanasius's Life of Anthony is attributed to him. Of all hermits the name of Anthony is perhaps the best known. He died about the middle of the 4th century at the age of 105. It is remarkable to what a great age many of these men who so illtreated their hodies attained. Anthony's temptations in the desert became famous, and his austerities were eagerly emulated. austerities were eagerly emulated. For a popular account of the wide and rapid growth of the system from the 4th century, see Farrar's Lives of the Fathers (1889), vol. ii. ch. 16. The deserts of Egypt were thronged with recluses. Thousands of anchorites inhabited solitary cellus. inhabited solitary cells; conc-bites formed themselves into ascetic communities. So many ablehodied men betook themselves to the wilderness, and thus exempted themselves from the ordinary duties of citizenship, that the Emperor Valens saw fit to withdraw the immunity from military service which had been granted to the 'religious,' and compelled them to serve in his army. The causes for this strange movement were both religious and secular. The world was a difficult field for the spiritual and pure-hearted. An impression widely prevailed that matter was essentially evil, and the body was a thing of corruption to be subdued at any price. There was little comprehension of the theory of altruism, but a general sense of the need which each soul had to secure its own personal salvation, as is

graphically expressed in Tennyson's poem on Simeon Stylites. But in addition to this there were certain secular causes. The times were very hard. Taxation was intolerably burdensome. Military service was hateful to many. The struggle of life was keen. A life of privileged solitude, full of self-imposed hardships, but free and honoured, seemed to many the easiest escape from their difficulties. Enthusiasm grew through the legends which soon gathered about the most celebrated hermits, and the writings of Jerome and Cassian made all familiar with the wonders which glorified the more saintly lives.

Sta Basil may be said to be the

founder of the monastery, as distinct from the life of the wandering hermit. He retired into Pontus to escape the Arian heresy, and the communities which he formed (middle 4th century) became strongholds for the orthodox faith. He was the first to draw up a set of rules for the government of monasteries. In a letter to St. Gregory Nazianzen he says that the one repast which the monks were permitted to take each day consisted only of bread and water, with some herbs. St. Athanasius is credited with the introduction of monasticism into Italy about 340 A.D. St. Martin of Tours erected the first monastery in Gaul. Hermits were found in the West as well as in the East. At the beginning of the 6th century a strong revival of the monastic system took place under St. Benedict. Nearly all the Western monastic bodies are offshoots or modifications of the Benedictines. The conversion of a large part of Europe is due to the itineration of monks. The monks of Iona went far and wide. The Benedictines Willibrord and Boniface devoted their lives to the barbarous tribes of N. Germany. The Irish monasteries earned a high reputation as seats of learning. The mediæval monastery played a most beneficent part in the preservation of light in the midst of gross darkness. It afforded a home for the saint, a place of retirement for the scholar, a means of succour for the poor, a teacher of the ways of peace and order to a strife-torn and lawless world. The peaceful, the gentle, and the feeble found their only refuge in the monastery. The system in the monastery. The system had its patent defects. It produced bigots as well as saints in its earliest developments. The Egyptian monks became a terror to their bishops as well as to all whom they suspected of any want of orthodoxy (Socrates. bk. vi. ch. 7). Canon Kingsley draws a not unfair description of their fanatic fury in Hypatia.

great reform of the Benedictine order; they originated at Clugny in Burgundy (910). In 1098 Stephen Harding founded a stricter type at Citeaux, whence the Cistercians. Another type enjoining absolute silence and solitary retirement was that which had its seat at Chartreuse, whence the Carthusians. In the 12th century William of Corbeil introduced into England the Austin canons, or black monks, who produced offshoots known as Premonstratensians. At Semp-ringham in Lincolnshire origi-nated the Gilbertine canons, the only order of English origin. The crusades developed military orders - the Knights Templars and the Knights Hospitallers (or Knights of St. John of Jerusalem). Fox(Monks and Monasteries) gives the following as the number of religious houses in England in the reign of Henry VIII.: Benedictines, 112 monasteries and 74 nunneries; Carthusians, 9 monasteries; Cistercians, 75 monasteries and 26 nunneries; Clugniacs, 19 monasteries and 1 nunnery; Augustines or Austin canons, 158 monasteries and 15 nunneries; Præmonstratensian canons, 30 monasteries and 2 canons, 30 monasteries and 2 numeries; Gilbertines, an order consisting of both monks and nuns, 25 houses; Fontevraud nuns, 3 houses; Minoresses, 3 houses; Brigettines, 1 house; Bonhommes, 2 houses; Knights Hospitallers, 28 houses; Friaries, 22 houses; Friaries, 23 houses; Friaries, 23 houses; Friaries, 25 houses; Friaries, 27 houses; Friaries, 28 houses; Friaries, 27 houses; Friaries 33; other houses, dissolved by Cardinal Wolsev. 29. The annual revenue of the 616 houses which were dissolved under Henry VIII. was estimated at £142,914, 12s. 9d. by the commission of survey. Recent suppressions of monastic institutions on the Continent have been frequent, especially in France, but rather on the ground of state expediency than that any misdemeanours were alleged against the inmates. See Helyot's Histoire des Ordres Religieux (1714; new ed. 1860); Montalem-bert's Monks of the West (Eng. trans. 1861-79); Milman's Hist. Latin Christianity (1854); Handbook to the Convents and Religious Houses in the United Kingdom (1885); Stokes's Ireland and the Celtic Church (1888); Margaret Stokes's Three Months in the Forests of France (1895); Borlage's The Age of the Saints (1893); Graham's St. Gilbert of Sempringham and the Gilbertines (1901). Monastir, or Monastin Bi-

The Clugniacs represent the first

TOLIA, tn., Macedonia, Turkey, Europe, 87 m. w.n.w. of Salonika. It has tanneries and manufactures of silver filigree, woollen stockings, and carpets. Pop. 45,000 (twoand carpets. fifths Mohammedans).

Monboddo, JAMES BURNETT, LORD (1714-99), Scottish judge and metaphysician, born at Monboddo House, Kincardineshire. He came into prominent notice by his share in conducting the celebrated Douglas cause, and was in 1764 appointed sheriff of Kincardineshire. Three years later he was raised to the bench as Lord Monboddo. His first work, in which he practically anticipated Darwin in regard to the descent of man and his affinity with lower types, was entitled Of the Origin and Progress of Language (6 vols. 1773-92). Antient Metaphysics (6 vols. 1779-99) was written in defence of Greek philosophy. Johnson visited him at Monboddo in 1773, and Burns saw much of him during his first visit to Edinburgh. Sketches of him appear in Kay's Original Portraits (1877). See Lord Mon-boddo and his Contemporaries, by Professor W. Knight (1900).

Moncalieri, tn., Turin, Piedmont, Italy, on r. bk. of river Po, 5 m. s. of Turin. Its royal palace dates from the 15th century. Matches are manufactured, and there are brick and lime kilns. Pop. (1901) 11,467.

Monchique, tn., prov. Algarve, Portugal, 40 m. N.W. of Faro, has a sanatorium and hot sulphur springs. It produces wine, olives, and chestnuts. There is a woollen industry. Pop. (1900) 7,339.

Monck, Sir Charles Stanley,

FOURTH VISCOUNT (1819-94), first governor-general of Canada, was born at Templemore, Tipperary. He was member for Portsmouth (1852), and held office under Lord Palmerston. In 1861 he was appointed captain-general and governor of Canada and British N. America. He inaugurated the federal constitution of the Dominion of Canada (1867). On his return he served on the Irich Land and Education Commis-

Monck, George, First Duke OF ALBEMARLE (1608-70), British general and admiral, was born at Potheridge, Devonshire; served at Cadiz (1625), Rh6 (1627), also in the Dutch army (1629) for some years, leading the forlorn hope at Breda (1637); colonel under Charles I. in the Scottish war (1639); taken by Fairfax at Nant-wich (1644), and sent to the Tower (1644-6). He wrote Observations on Political and Military Affairs (1671). On his release he assumed a parliamentary command in Ireland (1646-7), when he was consured for making terms with the rebols. Lieut.-general under Cromwell, he distinguished himself at Dunbar (1650), and (1653) acted successfully as admiral against the Dutch. Commander in Scotland (1654), he seized Edinburgh (1659), and seized Edinburgh (1659), and (1660) entered England with his army and restored Charles II.

Admiral of the fleet (1664), he beat (1666) the Dutch in a three days' sea-fight. He was buried in Westminster Abbey. See Lives by Gumble (1671), Guizot (1851), Corbett (Men of Action, 1889).

Monckton, Maria Louisa, LADY, English actress, was born at Ipswich. She showed great talent as an amateur actress, and appeared professionally in 1886 at the Haymarket in Jim the Penman. She created the rôle of Jim the Penman's wife, and afterwards played in The Red Lamp, Captain Swift, The Crusaders, and other dramas. She married Sir John Monckton, clerk to the city of London (1858).

Mondova, tn., prov. Ccahuila, Mexico, 110 m. N.W. of Monterey; contains railway shops.

15,000.

Moncreiff, SIR HENRY WELL-WOOD (1750-1827), Scotlish theologian and author, born at Blackford, Perthshire; became minister of St. Cuthbort's, Edinburgh (1775), and moderator of the General Assembly (1785). He was a popular preacher and chief of the Whig party in the Church of Scotland. Chief works: Discourses on the Evidence of the Jewish and Christian Revelations (1815), and An Account of the Life and Writings of John Erskine, D.D. (1818).

Moncreiff, James, Baron Moncreiff of Tulliebole (1811-95), Scottish lawyer and politician, and lord justice-clerk of Scotland, was born in Edinburgh. He was called to the bar (1833), and soon gathered a large practice. but pursued politics with keener activity than law. In Parliament he carried measures to abolish religious tests in Scottish universities, and to amend the law of entail, of evidence, and of bankruptcy.

SIR ALEXANDER Moncrieff, (1829-1906), British soldier and inventor, was born in Perthshire. He was the inventor (1868) of the Moncrieff Pit' excavations used for mounting the heavy ordnance of coast batteries. It is someof coast batteries. It is some-times called the 'disappearing system,' as the gun after firing recoils into shelter, and the energy of the recoil is stored up so as to raise the gun again into the firing position when required.

Moncton, tn., New Brunswick, Canada, 88 m. N.E. of St. John, headquarters of the Intercolonial Railway. It has cotton mills and foundries. Pop. (1901) 9,026.

Mond, Lupwig (1839), chemist, was born at Kassel, Germany; studied under Bunsen at Heidelberg, and came to England in 1862. Besides the gift to the nation of the Davy-Faraday research laboratory of the Royal Institution, his most important work has been in the development of chemical industry in Britain, particularly by the introduction of the ammonia-soda process of manufacturing sodium carbonate, and of late years by the production of 'producer gas' from uscless slag and its distribution for power purposes. In 1873, in partnership with J. T. Brunner, he founded the firm of Brunner, Mond, and Co., whose alkali works are now the largest in the world. His discovery with Langer and Quincke of nickel carbonyl is not only of great theoretical interest, but is utilized commorcially in the preparation of the pure metal.

Mondoñedo, tn., prov. Lugo, Galicia, Spain, 12 m. from coast of Biscay. Its cathedral dates from the 12th century. Cotton and linon goods are manufactured, and marble quarried. Pop. (1900)

10.590.

Mondovi, tn., prov. Cuneo. Piedmont, Italy, 13 m. s.e. of Cuneo. Its chief features are an old citadel (1573) and a cathedral (1450). It had a university from 1560 to 1719. Earthenware, paper, and silk are manufactured. Here in 1796 the French defeated the Austrians. Pop. (1901) 18.982.

Austrians. Pop. (1901) 18,982. Monet, CLAUDE (1840), French impressionist and open-air landscape painter, born at Paris. His Scine Pictures are the epitome of river and sky effects. He was mainly influenced by Corot, Millet, Manet, and Degas. He was a valiant fighter in the crusade against mannerisms and academical convention, which ended in individual freedom for the artist. The study of Turner's pictures in London opened poetic possibilities to him, and he thereafter devoted himself to the study of the subtle gradations of light, of evanescent, intangible effects of sunlight through mist. See Duret's Le Peintre C. Monet (1878).

Monetary Unions, formed between different states, for establishing a common monetary unit in the interchange of coinage. In 1865 was formed the Latin Monetary Union between France, Belgium, Italy, Switzerland, Greece, and subsequently Roumania, Servia, and Spain, with the franc or lira as unit. Since 1870 Germany has its own union of states, with the mark as unit. The Scandinavian Union includes Denmark, Norway, and Sweden, and has a monometallic gold standard (krone = 1s, 13d.) on the decimal system.

Money acts as (1) a medium of exchange, and fulfils the functions of (2) a measure (or common denominator) of value. In order to discharge the first of these duties, it must be generally acceptable, and various commodities have satisfied this primary

condition in different countries at different times. Salt, rice, cocoa, olive oil, tobacco, tea, and dates, with other articles, are mentioned by F. A. Walker (Money, ch. ii.), and cattle were thus employed by ancient peoples. With the progress of civilization the place of thes iniscellaneous commodities has been generally taken by the precious metals. These not only possess general acceptability, but they are also portable, for they admit of division into pieces of convenient magnitude, readily recognized, and containing a great amount of value in a small bulk. They are in addition durable; and consequently, although passing from hand to hand, they are relatively little affected by wear and tear, while their value remains comparatively steady. Stability of value, and, in a less degree, case of division, are desirable, if not necessary, qualities for measures of value also. For short periods, accordingly, the precious metals form good measures of value; for longer periods, when the further function of (3) a standard of deferred payments comes more distinctly into view, they are, on the whole, more suitable than any other single commodity, although some writers have suggested a preference for corn: and in England corn has been thus employed under the Tithe Commutation Act of 1836. But they are in-ferior to a tabular standard, based by a somewhat artificial and elaborate mothod on the average drawn from variations in the prices of a number of commodities. They would also appear to be more imperfect taken singly than if they were combined to form a double standard in a bimetallic system. The adoption of coin in place of bullion adds in no small degree to the convenience and efficiency of money. Successive developments of coining-such as stamping one side, and then the other, and then milling the edges, to prevent removal of the metal by clippers or sweaters-have rendered coins at once more easily recognized and more lasting. A further advance in monetary practice has been the distinction established between 'standard' and 'token' money. Token coins, such as silver and bronze in Great Britain, are used for smaller payments. They do not contain as much metal as their face-value represents, and no temptation is offered for their removal from the country where they possess this conventional value to another country, where they would only be taken at the intrinsic value of the metal contained. By limiting their issue the conventional value is preserved by refusing legal valid-

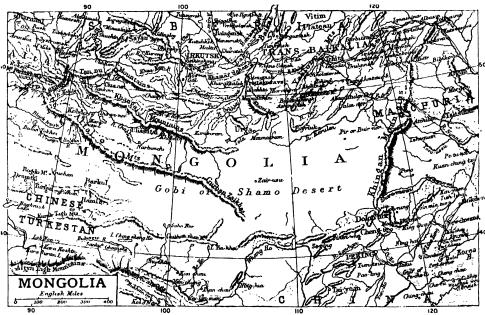
ity to their tender in payment for debt beyond a certain small amount (£2 in the case of silver, and is. in that of bronze), unwillingness to accept them is avoided, the individual holder escapes serious risk, and the danger of illicit or fraudulent coining is reduced. Standard money, by contrast, is legal tender to any amount, and is freely, though not of necessity gratuitously, coined. Free coinage means that the minting authorities place no restriction on the quantity of bullion which they receive. Gratuitous coinage implies that the government bears the expense of the transaction, and makes no charge for its services. In Great Britain, where gold alone is standard money, and the system is monometallic, the coinage of gold is both free and gratuitous. The Bank of England, acting as the agent of the mint, charges a small sum as interest for the time occupied by the process of minting, and gives immediately to the tenderer of bullion an amount in coin which differs only by this slight deduction. In other countries in the case of standard money, and in Britain in that of token money, a charge is made for coining. A 'seignior-age,' as it is called, is deducted, and less metal is put into the coin than the value on the face represents. If the seigniorage amounts to no more than the cost of coining, it is termed 'brassage.' By increasing the seigniorage, or debasing the coins, different governments have in times of difficulty, to meet expendi-ture willingly or involuntarily incurred, raised what is in effect a forced loan from their subjects, at the risk—never small, and often calamitous—of disturbing business relations. Paper money, the intrinsic value of which is nil, though the conventional value may be great, has been aptly described as money on which the seigniorage charge is one hundred per cent. The large part played by money in effecting the exchange and measuring the value of goods has led to exaggeration of its importance as an element of national wealth. Early bullionists attempted to keep the precious metals by main force in a country. Later, the mercantilists aimed at securing in the long run a favourable bal-ance of trade, which was shown in a greater export than import of goods and an influx of bullion to settle the balance. Adam Smith in his Wealth of Nations (book iv.) controverted the mercantilist arguments with success; but the ideas survive in the ordinary language of the money market, and may be traced in subtler guise beneath some of the arguments advanced in favour of protection. F. A. Walker's Money (1878) contains a detailed treatment of the subject. His shorter Money in its Relations to Trade and Industry (1883) is interesting and instructive. W. S. Jevons's Money and the Mechanism of Exchange (1872), J. S. Nicholson's Money and Monetary Problems (5th ed. 1901), and J. L. Laughlin's Principles of Money (1904) should be consulted.

Money-lender. The stringent usury laws of the middle ages were repealed both in England and Scotland in 1854, for their stringency always rendered

under penalty of a fine not exceeding £100 for the first offence. It is a misdemeanour punishable by two months' imprisonment or a £500 fine for a money-lender by false statements fraudulently to induce any person to borrow money. The expression 'money-lender' does not include (1) pawn-broker; (2) registered friendly or building societies; (3) brokers or insurance companies; (4) any corporation empowered by Act of Parliament to lend money; (5) any corporation exempted by order of the Board of Trade from registration under the act. Under the Betting and Loans (Infants) Act, 1892, it is a misdemeanour to send

Monghyr, munic. tn., cap. dist. of same name, Bengal, India, extending for 6 m. along r. bk. of Ganges, 80 m. s.e. of Patna. Formerly it was noted for firearms, swords, and general ironware. Cotton, cloth, and shoes are made. Pop. (1901) 35,880. The district has an area of 3,921 sq. m., and a population (1901) of 2,068,804.

Mongolia, region of Central Asia, nominally belonging to the Chinese empire, bounded on the N. by Siberia, on the E. by Manchuria, and on the s. by China proper. The area is about 1,300,000 sq. m.; the population perhaps 3,000,000. (1.) Central



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them both ineffectual and prejudicial to legitimate trade. But courts of equity in England have always given relief against unconscionable bargains and contracts. The Money-lenders Act of 1900, which applies to the United Kingdom, enables the court to reopen any money-lending transaction when the interest or charges are excessive and the transaction is harsh and unconscionable, or is otherwise such that a court of equity would give relief, and to relieve the person sued from paying more than is thought by the court to be fairly due. A money-lender must also register his own or his trade name and address, and can only carry business at such address and under his registered name,

betting or money-lending circulars to any infant.

Monforte de Lémos, tn., prov. Lugo, Galicia, Spain, 75 m. S.E. of Corunna. It contains a palace of the counts of Leon. It manufactures linen, soap, and chocolate. Pop. (1900) 12,912.

Monge, GASPARD (1746-1818),

Monge, GASPARD (1746-1818), French mathematician and physicist, was born at Beaune. He was appointed (1780) professor of hydraulics at Paris. He is the inventor of the method of descriptive geometry. He founded (1794) the Ecole Polytechnique. He accompanied (1798) Napoleon I. to Egypt as chief of the scientific expedition. He wrote Géométrie Descriptive (1795). See Life, in German, by Obenrauch (1893-4).

Mongolia, or Mongolia proper, is mainly composed of stony and sandy desert, passing into steppe or thin pasture country, commonly called Gobi (Shamo or Han-hai in Chinese). (2.) Northwest Mongolia includes a number of mountain chains, mostly starting from the Russian Altai, and reaching E. to the Urga region and beyond. (3.) South-east Mongolia, Inner Mongolia. largely formed of the Great Khingan and Inshan chains, is really a transition from the Gobi country to the fertile lands of Manchuria and China. East of the Selenga the Kentei Mts. form a highland knot for N. Central Mongolia. No rivers of any size rise in Mongolia, except on the N. margin, from which they flow

into or across Siberia—e.g. the Yenisei and Selenga; or on the N.E. extremity, where some of the headwaters of the Amur take their rise. The only important lake is Kosso-gol, or Kosgol, an alpine basin which overflows into the Selenga. The Mongolian climate is highly continental or extreme. At Urga a range of

gypsum, sulphates of sodium and magnesium, some graphite, a little coal, and silver-lead ore. Only one coal mine is worked, 60 m. s.e. of Kobdo. Oxen, sheep (mostly flat-tailed), camels, and horses constitute the chief wealth of the Mongols. Yaks, goats, pigs, asses, mules are also found. Except for some Chinese immi-



7 Types of Nomad Mongols. 8 9 1. Tangut. 2. Khalka. 3, 4, Kalmuks. 5. Burlat. 6. Eleut. 7. Särtäng Mongol. 8. Mongol of Shaing. 9. Kalmuk of Astrakhan.

185° F. has been observed between annual extremes. Tempests of almost unequalled violence are a special feature of the whole of the Gobi region, especially in winter and spring. Nevertheless Mongolia in general is healthy, dry, and extremely invigorating. Among the chief mineral products are salt, saltpetre,

grants and a few Turks in the w., and Tunguses in the E., all Mongolia is inhabited by Mongols. All are Buddhists, save for a few Shamanist tribes in the Altai Mts. The Buddhist clergy number fully a third of the total population. The Kutukhta Lama at Urga is chief of all Buddhists N. of the Great Wall. Trade is

carried on principally with China and Russia. (See Mongols.) The first European explorers of Mongolia were Friar John de Plano Carpini (1245-7) and William de Rubruquis (1253-5). Marco Polo passed along the southern border (c. 1274-5). See Pejevalsky's Mongolia (Eng. trans. 1876); Gilmour's Among the Mongols (1883), and More about the Mongols (1883); and Rockhill's Diary of a Journey through Mongolia (1894).

Mongolo-Tartar. See URAL-

Mongols, an Asiatic people who range over a vast domain between Siberia, China, and Ti-bet. (See MONGOLIA.) The Mongols constitute a main section of the Mongolo-Turki or Ural-Altaic stock, and comprise five chief branches: (1) The Sharras (Khal-Naimans, Ordos, others) of E. Mongolia and the great bend of the Hwang-ho; (2) the Kalmuks (Eleuts, Turguts, Durbats, and others) of W. Mongolia, Zungaria, and Astra-khan; (3) the Siberian Mongols Buikal; (4) the Tibetan Mongols (Tanguts, Sokpas, and others) of N.E. Tibet; (5) the Persianspeaking Afghan Mongols (Hazaras and Aimaks) of N. Afghanwhen the Mongol power was finally broken, those subject to China (Sharras and Kalmuks) have been organized on a semimilitary basis (banners) under their hereditary chiefs, many of whom claim descent from Jenghiz Khan. (See JENGHIZ KHAN.) The typical Mongols are distinguished by their yellowish colour, heredway belief brachycephalic (short) heads, broad flat features, very promi-nent check bones, small nose, small black and oblique eyes, long lank jet-black hair of the horse-tail texture and round in transverse section, robust under-sized figures, coarse build, and ungainly appearance, except in the saddle, where most of their time is passed. Mentally they are of sluggish temperament, sullen and taciturn, a decadent people, spoken of by all recent observers as apathetic, and even cowardly. The Mongol language, spoken with considerable uniformity by all branches of the family, is a typical member of the Ural-Altaic linguistic stock, somewhat intermediate between Turki and Manchu. It has been cultivated since the 13th century, when it was reduced to written form with an alphabet adapted from the Syro-Uighur, the letters being connected by continuous strokes and disposed in vertical lines, which are read from left to right. Mongol literature consists mostly of translations of Tibetan and Chinese Buddhist writings, with some national chronicles and legendary matter, and scarcely any poetry beyond a few popular songs. See H. H. Howorth's History of the Mongols (1876-88); N. M. Prejevalsky's Mongolia and the Tangut Courter (Eng. trans. 1876)

gut Country (Eng. trans. 1876).

Mongoose, or Mungoose, the Indian name for Herpestes mungo, a small carnivore, allied to the civets. The Egyptian species of the genus is familiar as the ichneumon, but many zoologists now use the term mongoose for all the members of the genus. In the true or Indian mongoose, as in all its allies, the toes bear non-retractile claws, scentglands are absent, and the animal is thoroughly carnivorous. It reaches a length of about eighteen inches, exclusive of the tail, and is of a uniform gray or rufous tint. Though fierce in disposition, it is readily tamed, and is a great favourity on account of its prowess as a destroyer of venomous snakes. It is also very useful in destroying rats, and was on this account introduced into the W. Indies in 1872. The mongoose is not immune to snake poison; its apparent immunity is simply due to the agility with which it protects itself against the bite of the snake, and per-haps also in part to the thick skin, and the long stiff hair, always erected during combats with snakes.



Indian Mongoose.

Monica (332-387), mother of St. Augustine, famous for piety and devotion to her son.

Monism, that speculative theory of the universe which attempts to reduce it, with all its apparent diversity, to the unity of a single principle. Monism is thus opposed to any kind of m madism or pluralism, and also more particularly to any form of dualism. But in face of the fundamental dualism of matter and mind the monist must either make his ultimate principle material, in which case his monism passes over into materialism; or he must make it mental, in which case his monism becomes a version of idealism; or, finally, he must assert an ultimate principle in which the sides are in equipoise. two Ma-

terialistic monism had its most rigorous and extreme exponent in the early Greek philosopher In later Greek Parmenides. philosophy materialistic monism found a more elaborate expression in the metaphysics of the Stoic school. Modern monism adopts either the second or the third alternative. Spinoza is the most conspicuous representative of the monism which preserves matter and mind in equipoise as aspects of a single substance. The prominence of physical science in modern thought has brought it about that much that calls itself monism (e.g. Haeckel in his book under that title) of this Spinozistic type throws all the real weight on the material side, and is little better than materialism in disguise. Of idealistic monism Hegel, and in a sense Schopenhauer, would usually be regarded as examples; but this classification and juxtaposition is open to objection.

Monist, The, a quarterly magazine devoted to the philosophy of science. It is published in Chicago and London, and is edited by Dr. Paul Carus, by whom it was founded in 1890. It includes articles on biology and evolution, physics, mathematics, electricity, astronomy, psychology, philology, metaphysics, and the historical aspects of religion and ethics. George Romanes was a constant contributor to the Monist, which has also published writings by Weismann and Lombroso.

Moniteur, LE, French journal, started by C. J. Panckoucke as La Gazette Nationale in 1789. Its importance as a register of events begins with the crisis of Aug. 10, 1792. In 1800 it became, as Le Moniteur Universel, the official organ of government, and continued till 1869, when it was supplanted by the Journal Officiel. Afterwards it was published as an Orleanist paper.

Monitor, a large lizard of the genus Varanus, which includes nearly thirty species, distributed over S. Asia, Africa, and Australia. The body may reach a length of from six to seven feet, so that the monitors are the largest of the lizards. They have a long, deeply biid, smooth, and protractile tongue, and feed upon whatever animals they are able to overcome. The habitat is very varied, some species being partially aquatic, while others inhabit forests, and still others dry sandy deserts. Both pairs of limbs are present and are well developed, and there is a long tail. An example is V. niloticus, found throughout the whole of Africa. An Asiatic species, V. salvator, is eaten by the natives of Burma, as are also its eggs. Certain

species feed on the eggs and young of the crocodile.



Monitor Lizard.

Monitor, a class of battleships which carry on open decks one or two revolving turrets containing big guns. The original Monitor was designed by Captain Ericsson, and was used victoriously against the Merrimac in the American civil war (1862). Several English vessels were built on the principle of the turret system, notably the Devastation, the Royal Sovereign, the Thunderer, and the Dreadnought.

Monk. See Monasticism, Monastery.

Monkey, a name often loosely applied to the members of the order Primates. We use it here to exclude (1) the anthropoid apes, and (2) the marmosets. As thus limited, it includes the New World monkeys, the Cebidæ of naturalists, and the Old World monkey, or Cercopithecidæ. A monkey possessing a prehensile tail, and devoid of check-pouches and ischial callosties, and without an opposable thumb, hails from America; but, on the other hand, an Old World monkey may have no thumb or tail, and may likewise be withoutcheck pouches. In such a case, however, the presence of callosities, or bare patches over the ischia, would indicate the relationships.

Monkeys are typically arboreal animals, admirably adapted for swinging from bough to bough of the trees among which they live. The American forms, in spite of the assistance rendered by the tail, are much less agile and supple than their Old World representatives, who, by aid of their four 'hands,' perform wonderful feats of gymnastics. The typical diet consists of a mixture of fruit and insects, but there is considerable variation in detail. The intelligence, according to most observers, is notably higher in the Old World forms than in the American types.

Most species are social in habit, living in flocks under the leadership of an old male, who is often exceedingly tyrannical in dis-

position. In the wild state, no less than in confinement, much attention is given to the care of the body and to cleanliness. Monkeys are mostly creatures of the sun, and rarely stir until the air is thoroughly warmed. In tropical countries they often work great havoc in gardens and Monkey Wrench, a screw key or spanner with movable jaw, which can be adjusted by a screw or wedge to the size of the nut which it is required to turn.

Monk-fish. See Angel-rish. Monkhouse, William Cosmo (1840-1901), English poet and ites (1887), The Earlier English Water-colour Painters (1890), and British Contemporary Artists (1899). His most striking poem is The Christ upon the Hill (1895). He wrote lives of Turner (1879) and Leigh Hunt (1893).

Monk-seal, a member of the true seals or Phocidæ, found in the Mediterranean and in the adjacent parts of the Atlantic. Its scientific name is Monachus albiventer, and it is characterized by the fact that the nails of both fore and hind feet are small and rudimentary, and the first and fifth toes of the hind feet greatly exceed the others in length.



Monk-scal.

Monkshood. See Aconite. Monkswell, Robert Porrett COLLIER, FIRST BARON (1817-86). English judge, was called to the bar (1843), Q.c. (1854), solicitor-general (1863-6), attorney-general (1868-71), judge of Common Pleas (1871), raised to the peerage (1885). He was author of treatises on the Railways Clauses Acts (1845), Mines (1849), and Joint Stock Companies (1875).

Monmouth, a British first-class armoured cruiser (9,800 tons), launched in 1901. The name has been borne by ships of

the navy since 1668.

Monmouth. (I.) Municipal and parliamentary borough (conjointly with Newport and Usk), cap. of Monmouthshire, England, on the Wye. There are corn and saw mills, smelting and tin-plate works. Only slight vestiges remain of the castle, favourite residence of John of Gaunt, and birthplace of Henry You and of the priory, both founded in the 11th century. Pop. (munic. bor. 1901) 5,095. (2.) City, Illinois, U.S.A., co. seat of Warren co., 95 m. N.W. of Springfield. It manufactures ploughs. Pop. (1900) 7,460. (3.) Village, Monmouth co., New Jersey, U.S.A., 25 m. N.E. of Trenton; was the scene of a drawn battle between the British and the Americans under George Washington in 1778.

Monmouth, JAMES, DUKE OF (1649-85), was born at Rotterdam, an illegitimate son of Charles II., as was alleged by his mother (Lucy Walters), but more prob-



Types of Monkeys.

Cebidæ;.—1. Red-backed sakl. 2. Brown howler. 3. Brown capuchin. 4. monkey. Cercopithecidæ:-5. White-tailed guereza. 6. Snub-nosed monkey. m caque. 8. Gelada. 4. Woolly spider-

plantations; but in spite of this, one of the most destructive, the langur or hanuman (Semnopithecus entellus) of India, is regarded as sacred. See Romanes's Animal Intelligence (1881).

Monkey Puzzle, a name sometimes applied to the tree Araucaria imbricata.

critic, was born in London. seventeen he became a clerk in the Board of Trade, and rose to be assistant-secretary to the finance department of the office. His first literary efforts were poems, but after 1879 he devoted himself to art criticism. writing The Italian Prc-Raphael-

ably of one of the Sidneys, to whom his mother was mistress. When in 1662 the boy was brought to England, he was lodged in the royal palace, created Duke of Monmouth, and married to the Countess of Buccleuch, April 8, 1663. On the same day he was created Duke of Buccleuch, upon which he adopted the additional name of Scott. Honours were heaped upon him during the first decade of his dukedom, and in 1670 he was appointed captaingeneral of the forces. He became the tool of Shaftesbury, who man-aged to implicate this 'Protestant duke, whose royal legitimacy now began to be asserted, in the Rye House Plot (1683). Monmouth fled to Holland, but returned in 1685, asserting his right to the throne. His rebellion was suppressed at Sedgemoor, and Monmouth was executed. See Roberts's Life....of James Duke of Monmouth (1844), and Fea's King Monmouth (1901).

Monmouthshire (anc. Gwent), maritime co. of England, on the Welsh border. The surface is in parts highly picturesque, and is mountainous in the N. and N.W. (Sugar Loaf, 1,954 ft.) In the S. are level stretches (Caldicot and Wentlog) protected by seawalls. The principal rivers, Wye, Monnow, Usk, and Rhymney, all drain to the Severn estuary. The county is rich in coal, the output in 1902 exceeding 10,000,000 tons; iron ore, limestone, sandstone, and clay are worked. Metallurgical industries are extensively carried on, the products including pig iron, steel, tin-plates, railway and bridge materials, and locomotives. The county returns three members to Parliament. Its ancient capital was Caerleon. Area, 539 sq. m. Pop. (1901) 292,327.

Monoceros, the Unicorn, a constellation to the s. of Gemini, figured by Bartsch in 1627. It is in the Milky Way, and contains some interesting nebulæ and clusters, especially N.G.C. 2237-9.

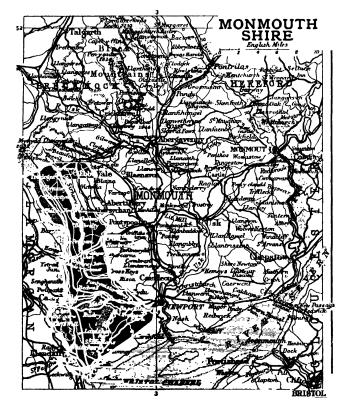
Monochætum, a genus of tropical shrubs and sub-shrubs belonging to the order Melastomaceæ. They bear panicles of red or purple flowers, and are sometimes cultivated in greenhouses.

Monochlamydes, sub-class of dicotyledonous flowering plants, characterized by one or both of the perianth whorls being absent from the flowers. It contains the orders Thymelaces, Conifers, Chenopodiaces, Eleagnaces, Polygonaces, Scieranthaces, Euphorbiaces, Empetraces, Callitrichaces, Ulmaces. Urticaces, and Amentaces.

Monochord, an ancient Greek instrument consisting of one string stretched across a long,

narrow box. By means of a movable bridge the string could be shortened at certain points, and thus could produce different tones. Guido of Arezzo (c. 990-1050) made use of it when training the boys of his choir. It was the forerunner of the clavichord and the pianoforte.

Monoclinal Strata are rocks the beds of which undergo a sudden change in their inclination or dip, and then resume their former disposition. In the Isle of Wight is the best example in seed-leaf remains within the skin to convey the food material stored up in the seed-skin into the growing plant. Other characteristics are that the primary or tap root soon ceases to grow, and secondary or adventitious roots are developed from the sides; the stem is usually unbranched, and on section shows the wood fibre distributed through the central tissues, but neither pith nor bark; the leaves are often narrow, with the veining generally parallel, and in the majority of cases the

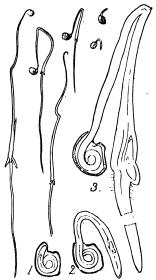


Great Britain, but in western N. America similar phenomena occur on a gigantic scale.

Monocotyledons, a sub-class of that division of the flowering plants (Phanerogamia) in which the seeds are enclosed in an ovary (Angiospermæ). They were formerly, and are still sometimes, called endogens, from a mistaken view of the order in which the wood fibres are formed. The embryo is, as a rule, small in comparison with the albumin surrounding it. It has a relatively large cotyledon or seed-leaf, which may be well seen in germinating onions. The tip of the

leaf-base forms a sheath about the stem. Seven orders are reckoned —Liliifloræ (rushes, lilies, irises, aloes), Enantioblasteæ (grasslike or herbaceous plants from the tropics and southern hemisphere), Spadicifloræ (palms, arums, duckweeds), Glumifloræ (sedges and grasses), Helobiæ (aquatic plants, such as water-plantain, watersoldier, and frog-bit), Scitamineæ (bananas, gingers, and cannas), and Gynandræ (orchids). It is probable that the primitive monocotyledons were closely akin to the living grasses, and, like them. adapted for wind-pollination. The two orders last in the list seem

to have sprung from the Lilifloræ, and in the orchids the contrivances for effecting insect pollination exhibit what Darwin called a prodigality of resources.



Seed of a Monocotyledon (Onion) germinating. 1, 2, 3, Diagrams of successive stages.

Monod, ADDLPHE (1802-56), theologian of the Reformed Church, born at Copenhagen. He studied at Geneva, and was two years chaplain at the Prussian embassy at Naples (1825-7). He afterwards became (1828) pastor at Lyons, and on the retirement of his brother Frédéric took his place at Paris (1844). His literary works were chiefly sermons. See Life and Letters of Adolphe Monod (Eng. trans. 1885).

Monod, Gabriel (1844), French historian, born at Havre; became professor at the Ecole des Hautes Etudes (1869) in Paris, and in 1880 professor at the Ecole Normale. Amongst his works are Bibliographic de l'Histoire de France (1888), of capital importance; Etudes Critiques sur les Sources de l'Histoire Meroningienne (1872–85); Etudes Critiques sur les Sources de l'Histoire Carolingienne (1898 f.); Les Maitres de l'Histoire-Renan, Taine, Michelet (1894); Jules Michelet (1905). He founded the Revue Historique in 1876.

Monodon. See NARWHAL.
Monocclous, a plant in which
the staminiferous and pistilliferous flowers are borne on the same
plant, as distinguished from a
dicecious plant, in which the male
and female flowers are borne on
different individuals.

Monogenism, the theory in ethnology which holds that mankind forms a single genus, with a single species-i.e. sprang from one pair or group, in one region, whence it spread by migration over the habitable world. There are three views:-(1) The Adamitic, which accepts the Mosaic account literally, and is consequently also obliged to accept a measure of evolution to explain the existence of the present human varieties; (2) the Rational. which frankly accepts evolutionary teachings as applicable to man in the same sense that they are applicable to all other biological genera and species; (3) the Intermediate, which endeav-ours to harmonize (1) and (2), and allows that the different environments, with the heredity of acquired characters and natural selection, are sufficient to account for the existing varieties of the human family, all being geneti-cally connected. To monogenism are opposed various shades of polygenism, which holds generally that the main divisions of mankind are sprung independently from different precursors in different geographical regions. Polygenist views are now generally discredited. See Huxley's Critiques (1873), and A. H. Keane's Ethnology (1896).

Monogram, an artistic com-bination of two or more letters interlaced, generally the initials of one or two names of cities, men. etc. An incomplete monogram may be formed of the initials of one or more names. A perfect monogram is one in which all the letters of the name or names are to be traced. Examples of monograms are to be found on early Greek coins, medals, and scals, standing for the names of rulers and individuals, or the names of the towns in which the pieces were All artistic craftsmen have made a wide use of monograms notably printers, as well as painters, engravers, papermakers, and potters, to whom the use of the monogram was a necessity. Masons' marks form a com-plete study of themselves, and the old trade-mark of the merchant was necessarily in the form of a monogram in those countries in which he was forbidden by law to use heraldic devices. The great vriter on the subject is François Brulliot (Dictionnaire des Monogrammes)

Monolith, a term denoting any free-standing pillar stone, whether unhewn or shaped and polished or sculptured. It is frequently applied to the upright stones referred to under MENHIR.

Monomania, a form of insanity specially related to mania, in which the patient entertains not only exalted notions of his own

importance, but has fixed delusions which dominate his life and conduct. It differs from melancholia in the absence of the pro-found and persistent depression, and from mania in the paucity of incoherent ideas, and in the existence of persistent delusions along with considerable reasoning and executive powers. Monomania may result from mania or from melancholia, but it may also arise independently. Its onset is generally preceded by a stage of depression. Both the moral and the intellectual side of the monomaniac's mind are affected. If thwarted or contradicted, he is sometimes ungovernable and dan-Monomania is seldom gerous. curable, and often terminates in dementia. The patient's physical health is often little affected.

Monometallism. See BIMET-

ALLISM.

Monongahela. (1.) River, U.S.A., a head-stream of the Ohio, rises in W. Virginia, and flows generally N. to its junction with the Allegheny at Pittsburg. Its drainage area is 7.625 sq. m.; length, 300 m. It is navigable to Morgantown, W. Virginia. (2.) City, Washington co., Pennsylvania, U.S.A., on river Monongahela, 19 m. S.E. of Pittsburg, in a coal and petroleum region. Pop. (1900) 5,173.

Monophysites, a heretical party in the early church, so called from their belief that there was in Christ only one nature. They took their rise as opponents of the decision of the Council of Chalcedon (451), and became very powerful in Palestine, Egypt, and Syria. Justinian I. sought to heal the schism by calling the Council of Constantinople (533 A.D.); but the Monophysites refused to be propitiated, and the movement spread rapidly to Armenia, Abyssinia, and Mesopotamia. The name Jacobites, sometimes given to this sect, is taken from that of Jakob el-Baradai, one of their leaders. Monophysitism is still a considerable force in the Eastern Church.

Monopoli, tn., prov. Bari, Apulia, Italy, on Adriatic, 25 m. s.g., of Bari; is the see of an archbishop. Its fortress was built in 1552 by Charles v. It exports olive oil, wine, flour, soap, and fruits. Pop. (1901) 22,616.

Monopolies. Before 1624 the crown exercised to an oppressive extent the right of granting to individuals exclusive commercial privileges. But by the Statute of Monopolies, 1624, all monopolies were declared void except letters-patent and grants of privileges for fourteen years or less of the sole working of new manufactures within the realm to the true and first inventor,

provided that such patents were not mischievous to the state or to commerce. The evils of monopolies were—(1) the raising of prices, (2) the deterioration of the commodity, (3) the impoverishment of poor artificers. Except in the case of patents, monopolies are not now granted to private individuals; but the government has a monopoly of postal, telegraphic, and telephonic communication, partly for revenue purposes, but largely to ensure a uniform and general public service; and exclusive rights within limited areas of supplying water, gas, electric lighting and power, and of working tramways and railways, are in the public interest granted by Parliament to local authorities and private companies. Some foreign governments retain the exclusive rights with regard to the sale of tobacco, watches, spirits, and some other things for the sake of revenue; and also work the railways, partly upon economic grounds, but principally because of their strategic value in war. The modern custom of uniting businesses of the same kind into large trusts or combines may have the saving of management expenses, and other ends in view; but the tendency is to create practical monopolies. See Hirst's Monopolies, Trusts, and Kartells (1905).

Mono-rail. See RAILWAYS.

Monotheism, the doctrine that there is but one God. Though not antagonistic to philosophical dualism, it is opposed to every form of religious dualism—e.g. Zoroastrianism and Manicheism; also to henotheism (the worship of one particular deity to the exclusion of others), but most of all to polytheism. The belief in the unity of Deity is held in its strictest logical form by Jews, Mohammedans. and Unitarians.

Monotheletes (7th century A.D.), the adherents of the doctrine that Christ had only one will. This hypothesis was put forward on the authority of the Emperor Heraclius and Bishop Honorius of Rome, in order to conciliate the Monophysite sect. Monothelism was banned at the sixth Ecumenical Council at Constantinople (680 A.D.), and the successor of Honorius was obliged to agree to the condomnation of the latter. A Monothelete party formed a community in Lebanon, and became known as the Maronites.

Monotremata, an order of mammals, included in the sub-class Prototheria, and containing only the ornithorhynchus, or duck-mole of Australia and Tasmania; the echidna, or spiny ant-eater of Australia, Tasmania, and New Guinea; and the proechidna, or three-toed spiny ant-eater of New Guinea. See Mammals.

Monotype. See Type-setting

MACHINES.

Monovar, tn., prov. Alicante, Spain, 20 m. N.W. of Alicante. Fruit and wine are produced. Woollen and cotton goods, leather, soap, and spirits are manufactured. Pop. (1900) 10,601.

Monrad, MARCUS JACOB (1816-97), Norwegian philosopher, was born near Tonsberg; studied under Schelling at Berlin, and became (1845) lector (from 1851 professor) of philosophy at the University of Christiania. His system in its main features is Hegelian. He wrote Psychologie (1850); Ethik (1851); Æsthe-tik (1889); Tunkeretninger i den nyere Tid (1874); Religioner og Christendom (1885).

Monreale, tn., prov. Palermo, Sicily, 5 m. s.w. of Palermo, looks down on the valley called Concha d'Oro (Golden Shell). Its magnificent cathedral, founded in the 12th century by William II., the Norman duke, is the metropolitan see of Sicily; its walls are covered with beautiful mosaics. Between Monreale and Palermo the massacre known as the Sicilian Vespers began in 1282. Pop. (1901) 23,556.

Monro, ALEXANDER, primus (1697-1767), physician and founder of the medical school of Edinburgh, was born in London; studied at Leyden under Boerhaave. He was professor of anatomy at Edinburgh (1720-59). He was Fellow of the Royal Society, London, and the author of The Anatomy of the Human Bones (1726), and Essays on Comparative Anatomy (1744). See Life by his son (1781).

Monroe. (I.) City, Louisiana, U.S.A., co. seat of Ouachita parish, on the Ouachita R., 75 m. w. of Vicksburg. Pop. (1900) Pop. (1900) 5,428. (2.) City, Michigan, U.S.A., co. seat of Monroe co., on Lake Eric, 35 m. s. of Detroit. Pop. (1900) 5,043.

Monroe, James (1758-1831), fifth president of the United States, was born in Westmoreland co., Virginia. In 1783 he was elected a member of Congress, and was chairman of a committee whose deliberations led to the conventions at Annapolis and Philadelphia, where the consti-tution of the United States was drawn up. As a member of the United States Senate (1790-4) he opposed the Federalists. He was then minister to France. Re-called in 1796, he served as governor of Virginia (1799-1802). For the next ten years he was engaged chiefly in diplomatic missions, of which the most important was that which carried through the Louisiana purchase. After serving in Madison's cabinet as sec-

retary of state and secretary of war, he was chosen president in 1816. His period of office was distinguished by the purchase of Florida from Spain, by the Mis-souri compromise limiting the slave area, and by the recognition of the S. American republics, and the consequent enunciation of the 'Monroe doctrine.' He was elected president for a second term, and in 1825 retired from active politics. The Writings of James Monroe were published in 7 vols. (1898-1903) by Hamilton. See *Life* by D. C. Gilman (ed. 1906).

Monroe Doctrine, a declaration of policy made by President Monroe in 1823 on behalf of the United States, which has since formed the cardinal maxim of the foreign policy of the republic. He declared (1) that 'the American continents are henceforth not to be considered as subjects for future colonization by any European powers; and (2) that we [the United States] should consider any attempt on their [the European powers'] part to extend their system to any portion of this hemisphere as dangerous to our peace and safety. With the existing colonies or dependencies of any European power we have not interfered, and shall not interfere.' Coercion, short of occupation of territory, the United States tolerates, but with suspicion—witness the Anglo-German blockade of Venezuela in 1902. In the eyes of the people of the United States the Monroe doctrine is sacred. Polk in 1845 claimed that it forbade the ac-quisition of all further territory by a European power. The Conby a European power. The Congress of 1867 thought it justified a protest against the formation of the Dominion of Canada. Cleveland held in 1894 that it justified interference in boundary disputes when the United States judged that the S. American state was not getting fair play. Roosevelt in 1902 and 1905 confined it to the occupation of territory. Lawrence's Principles of International Law (1895).

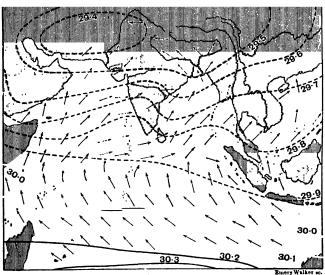
Monrovia, tn., cap. of Liberia, W. Africa. It exports palm oil and kernels, dyewoods and rubber. Pop. (1897) 5,000.

Mons (Flem. Bergen), city,

cap. of prov. Hainault, Belgium, 38 m. s.w. of Brussels. The church of Sainte Waudru, founded in 1450, is said to be one of the most beautiful churches in Bel-The town hall dates from the 15th century. The belfry (275 ft. high) is an elegant example of the Renaissance style. The industries include engineering works, cotton-spinning, and sugar-refining. Mons is situated on the Barinage coal field, with an output of some 12,000,000 tons annually. Pop. (1900) 27,015.

Monserrat, or Montserrat, mt., prov. Barcelona, Spain, on r. bk. of Llobregat. On its slope stands a Benedictine abbey, founded in 880, which contains Monson, SIR EDMUND JOHN (1834), British diplomatist, was born at Chart Lodge, Kent. He entered the diplomatic service in 1856, and was minister to Uruguay

The North-east Monsoon.



The South-west Monsoon.

These maps of the Indian Empire and part of the Indian Ocean show the height of the barometer and the prevailing winds over that area during each of the monsoon periods.

a small black image of the Virgin that attracts many pilgrims. Monsignore, a title of honour hestowed on ecclesiastical dignitaries of the Roman Catholic Church.

(1879-84), to the Argentine Republic and Paraguay (1884), to Denmark (1885-8), Greece (1888-92), and Belgium (1892-3). He was in 1893 made ambassador to the court of Vienna. There he

remained till August 1896, when he was appointed to Paris. He retired in 1904, and the following year received a baronetcy.

Monsonia, a genus of tropical shrubs and sub-shrubs belorging to the order Geraniaceæ. They are sometimes cultivated as greenhouse plants, and like a light soil containing a little peat and leafmould. M. speciosa, from the Cape of Good Hope, is the one most frequently grown. It grows to from six to eight inches in height, and bears large reddish flowers in spring.

flowers in spring.

Monsoons. The land during the summer warms up more than the sea; but in winter the water does not part with its heat so rapidly as the land, which then becomes the cooler. This gives rise to south-west winds from May to September over a large area ex-tending from Australia to India. Towards the end of May the burst of the south-west monsoon in India takes place in a succession of tremendous thunder-storms, the rainy season continuing for two or three months. The rain belt reaches Calcutta and Lower Bengal three or four weeks later than it reaches Colombo. In October the north-cast monsocn sets in, the change in the direc-tion of the wind being due to the marked increase of pressure in Central Asia, where the isobars show a pressure of 30'20 inches, while in the Bay of Bengal the barometric readings are fourtenths of an inch lower. north-east monsoon prevails from October to April, and during its continuance very little rain falls in India. The direction of the wind is not everywhere the same during the south-west monsoon. In the valley of the Ganges it blows from the south-east towards the hot plains of the Punjab, along the Chinese coast the direction is more southerly, while farther north it has a tendency to draw to the eastward. In the southern hemisphere the counterpart of the south-west monsoon is shown by winds blowing from the north-west, which are also subject to local changes, being northerly near Mauritius and Madagascar, and westerly on the north coast of Australia and Torres Straits.

The monsoon winds were known to Pliny (Hist. Nat., vi. c. 23) and to Aristotle. The Arabs had a very extended knowledge of these changes, a work by Sidi Ali on the navigation of the Indian Ocean published in 1554 showing the time of the commencement of each monsoon at fifty different places. See Blanford on the Climates of India, Ceylon, and Burmah (1889), and Buchan's Report on Atmospheric Circulation' in 'Challenger' Reports: Physics and Chemistry, vol. ii, pt. v.

Monstrance, the sacred utensil employed in the Roman Catholic Church for presenting the consecrated wafer for the adoration of the people. It is now, as a rule, in the form of a star with rays, the central portion of which is of glass, thus permitting the host to be seen. The use of the monstrance probably dates from the establishment of the festival of Corpus Christi in the 13th century.

Monstrosity. See TERA-TOLOGY.

Montagnana, tn., prov. Padua, Italy, 22 m. s.w. of Padua, contains a Gothic cathedral of 15th century; and manufactures silk, wool, hemp, and cotton goods. Pop. (1901) 10,323.

Montagnards, or Montagner, advanced republican and war party in the French revolution, nicknamed from the highest seats in the convention, where they sat (1793) as opponents of the Girondists (moderates), who occupied the floor of the house. Under the leadership of Marat, Danton, Robespierre, and St. Just, they overthrew the Girondists (May 31 June 2), and crushed all internal opposition by the reign of terror. They subsequently split into three parties, which destroyed each other, Robespierre and the Jacobins being the last to perish (1794). The name was revived in 1848. See Histoire des Montagnards, by Esquiros

(1847).

Montagu, a British first-class battleship (14,000 tons), launched in 1901. Prior to the naval manceures of 1905 the ship went ashore on Lundy Island (May 30) in a fog, and became a total loss, only some of the guns being salved.

Montagu, BASIL (1770-1851). English jurist and miscellaneous writer, and the friend of John Wilkes. Called to the bar in 1798, he won considerable reputation by his digest of the bankruptcy laws and through his efforts to confine the penalty of death to murder and treason. He published a Life of Bucon (1825-37) and a volume of essays. Montagu, CHARLES. See

HALIFAX, FIRST EARL OF.

Montagu, Edward. See
MANGHESTER, SECOND EARL OF.

Montagu, Edward. See
SANDWICH.

Montagu, Mrs. (ELIZABETH ROBINSON) (1720-1800), English authoress and social leader, was born at York, and married a grandson of the first Earl of Sandwich. Celebrated both for beauty and for genius, she was the friend of most of the notabilities of her time. Her epistolary talents, shown in her numerous letters, and her Essay on the Genius of Shakespeare (1769),

have made her name famous. See Life by Climenson (1905).

Montagu, LADY MARY WORT-LEY (1689-1762), English author-ess, eldest daughter of the Duke of Kingston. At the age of twenty one she translated the Encheiridion of Epictetus. In 1712 she married Edward Wortley Montagu, a friend of Addison. Her husband being appointed ambassador to the Porte in 1716. Lady Mary accompanied him to the East. The letters describing her travels, owing to their novelty, liveliness, and wit, won her an immediate reputation. On returning to England in 1718 she zealously advocated inoculation for smallpox, having practised it on her own children. From 1739 she resided permanently abroad, apart from, but on terms of friendly correspondence with, her husband. Avignon was her headquarters from 1742 to 1746, Brescia from 1746 to 1758, and Venice from 1758 to 1761. On Mr. Wortley's death, in 1761, she returned to England. As a writer of occasional verse her happiest pieces are Six Town Eclogues (published as Court Poems, 1716; authorized ed. 1749). Among the best of her productions are the admirable letters to her daughter, the Countess of Bute. Her literary criticisms, notably on Fielding, Smollett, and Richardson, have a value apart from their contemporary interest. In character she was cold and without enthusiasm, bitter in her hatreds, and inclined to cynicism; but she was capable of friendship, and not wholly unsympathetic. See her Letters (3 vols. 1763); Works (5 vols. 1803); Works (3 vols., ed. by Lord Wharneliffe, 1837), with Introductory Anecdotes by Lady Louisa Stuart ; Letters and Works (3rd ed. by W. Moy Thomas, with Memoir, 2 vols. 1861).

Montaigne, MICHEL EYQUEM, SEIGNEUR DE (1533 92), French essayist, born at the Château de Montaigne, near Bordeaux. At the college of Guienne in Bordeaux he was a pupil of George Buchanan. On the completion of his legal studies he became a member of the 'Court of Aids' for Guienne, Périgord, and Poitou, and later one of the councillorsgeneral in the Parlement of Bordeaux (1557). deaux (1557). By the death of his father, in 1569, he was called upon to assume the position of a territorial seigneur. The first literary work upon which he was engaged seems to have been the preparation of an edition of the poems of his friend Etienne de la Boëtie. Meantime he had com-Meantime he had commenced in 1571 the composition of Essais. Ten years elapsed before he published the first two books (1580). Shortly after this he paid a visit to Italy, and during his journey kept a diary, which, how-ever, was not published until 1774. In 1588, when issuing the fifth edition of his Essais, he added to it the third book, containing some of his finest work. Of the individual essays those on 'Constancy,' on 'Philosophizing constancy, on Friedsphizing being to learn how to die, on 'Friendship,' on 'Moderation,' on 'Glory,' on 'Presumption,' on 'Governing One's Will,' and on 'Experience' are generally regarded as the finest. Montaigne was an ethical analyst of first order, and he scrupled not to apply drastic remedies to patent moral evils. As a politician also he was a close observer of the progress and development of civil institutions, and his remarks thereon are charged with ripe wisdom and sound common sense. His style is admirably adapted to the matter, and his playful wit is never lacking. He has been called a sceptic, but only by those who mistook his moderation in all philosophical and spiritual matters for indifference. The standard French edition is that by Moutheau and Jouaust (1886-89), and those ed. by G. Saintsbury (Florio's trans., 1615) and Hazlitt (Cotton's trans. 1902, 4 vols.) the best English ones. See *Life* by Alphonse Grün (1855) and Bonnefon (1893). The Journal of Montaigne's Travels in Italy was translated and edited by W. G. Waters in 1903. See Dowden's Montaigne (1905); Lowndes's (1905); Montaigne Michel de Montaigne (1898); and G. Norton's Studies in Montaigne (1905).

Montalba, CLARA, marine painter. Her large and luminous effects in water colour first attracted attention, and she was elected a member of the Royal Water Colour Society in 1876. She is specially famed for her fine representations of Venetian scenes. Her sisters HILDA and ELLEN are also known as painters, and her youngest sister, HENRIETTA (1856-93), as a sculptor, mainly of portraits and busts in terra-cotta.

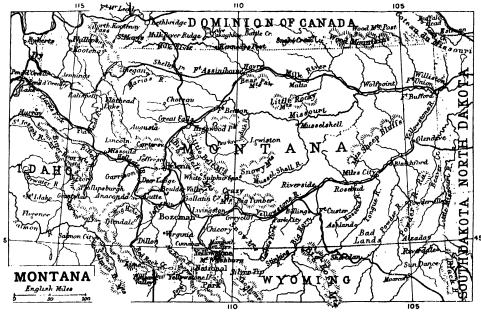
Montalembert, Charles Forbes de Tryon, Comte de (1810-70), was born in London. He early won a name as an orator. While fighting the educational policy of Louis Philippe's government, he was one of the managers of the newspaper Avenir, the leading idea of which was to reconcile the church with the democracy. When its views wore repudiated by Gregory XVI., Montalembert submitted. By way of relief to his disappointment he wrote Histoire de Ste. Elisabeth d'Hongroie (1836), a work which found many admirers. He was at first friendly to Louis Napoleon, but later, when the character of the new reign tecame more ap-

parent, was bitterly hostile. After 1857 he exerted from time to time agreat political influence by books and pamphlets. One of these, on a debate which took place in the British House of Commons in 1858, brought him into direct antagonism to the government. Perhaps he never rose higher than at the Congress of Malines in 1863, when he delivered a masterly speech in favour of toleration. His most considerable literary work was Les Moines d'Occident (5 vols. 1860-7; Eng. trans. Monks of the West, 1861-79). He belonged to that school of French Catholic thought which is best represented by the Récit d'une Sœur, in which he con-

rising from 2,000 ft. at the E. boundary to 5,000 ft. at the base of the Rocky Mts. in the W. The Missouri rises in s.w. Montana, and traverses the state to its E. boundary; with its branches —the Yellowstone, Milk, Sun, Marias, Teton, and others—it drains most of the state. The N.W. part is drained by the Clark Fork of the Columbia and its branches. The capital is Helena; and the largest city is Butte, the copper-mining town. Grazing is important. Farming proper, he-ing almost entirely dependent on irrigation, is confined to the river valleys. The principal industry is the smelting and refining of copper and lead. The

(1853). See monograph by Redi (1883).

Montanism, a schismatic movement which arose in the church during the 2nd century. Montanus, the originator of the movement, was a Mysian, and about 130 began to make the claim of being a divinely commissioned prophet, the bearer of a fresh influx of the Spirit. He proclaimed the imminent return of Christ at Pepuza in Phrygia. and demanded a radical transformation of the church's life e.g. by fasting, by regarding marriage as an inferior state, and by refusing to absolve from postbaptismal sin. Montanism gained adherents in Italy and Gaul, and



stantly appears, and by the Correspondant, with which he was most closely connected. He became a member of the Academy in 1852. He took a very strong part against Russia and in favour of Poland in 1861. In 1862 he wrote a remarkable little book about his friend, Le Père Lacorduire. See Craven's Le Comte de Montalembert (1873), and Vie by De Meaux (1897), and a monograph by Lecanuet (1895–1901).

Montalvan, Juan Perez De. See Perez.

Montana, a N.W. state U.S.A., with an area of 146,080 sq. m. It was organized as a territory in 1864, and admitted as a state in 1889. The E. part consists of traders along a state of 1889. sists of treeless plains, gradually

mineral products are gold, silver, and coal. Pop. (1900) 243,329, of whom 61'6 per cent. were males and 38 4 per cent. females.

Montanelli, GIUSEPPE (18 3-61), Italian writer and politician, was born at Fucecchio, on the Arno, and became professor of civil and commercial law at Milan in 1840. He then turned to politics, fought against the Austrians, became a triumvir (1849), and supported Mazzini. He was condemned, and lived several years at Paris. Thereupon he made propaganda for Napoleon III., both in France and in Italy (1859). His only work of value is Memorie sull' Italia especialmente sulla Toscana dal 1814 al 1849

in N. Africa won over Tertullian of Carthage. A synod at Iconium, in 235, declared Montanism to be a heretical system, and the Council of Constantinople (381) refused to sanction the baptism of Montanism-i.e., it put it on the footing of paganism. By 400 A.D. the movement was practically extinct. See Schwegler's Der Montanismus und die christliche Kirche (1841); J. de Soyres's Montanism and the Primitive Church (1878).

Montanoa, a genus of North American shrubs belonging to the order Compositæ. They bear white, yellow, or pink flowers in corymbose panicles. They are easily grown in ordinary fibrous loam in a cool greenhouse.

Montargis, tn., dep. Loiret, France, 29 m. s. of Fontainebleau. Its church of La Madeleine dates from the 13th century. There are remains of a 12th-century castle. It is noted as the scene of the judicial combat between the dog of Montargis and Macaire, its master's murderer. The town has manufactures of paper, india-rubber goods, cotton goods, and cutlery. Madame Guyon, the Quietist, was born here in 1648. Pop. (1901) 12,351.

Montauban, tn., dep. Tain-et-

Montauban, th., dop. Tain-et-Garonne, France, overlooks the Tarn R., 29 m. N. w. of Toulouse. It trades in wine and grain, manufactures silks and woollens, and was in the 17th century renowned for Montbéliard, tn., dep. Doubs, France, on Doubs R., 9 m. s.w. of Belfort. Its castle dates from the 15th century. Cuvier, the naturalist, was born here in 1769. The manufactures include files, knitting looms, clocks, and watches. Pop. (1900) 10,034.

Mont Blanc. See Blanc, Mont.

Montbretia. See TRITONIA.
Montbrison, tn., dep. Loire,
France, 20 m. N.W. of St. Etienne.
Its church dates from the 10th
century. It has mineral springs.
Pop. (1901) 7,520.
Montcalm, Louis Joseph,

Montcalm, Louis Joseph, Marquis DE (1712-59), French soldier, was born near Nimes. In 1756 he was appointed to the and spinning and weaving factories. Pop. (1901) 28,779.

Mont Cenis. See CENIS, MONT.

Mont Cenis. See Cenis, Mont. Montclair, city, Essex co., New Jersey, U.S.A., 10 m. n.w. of New York city. It is chiefly residential, and is a summer resort. Pop. (1900) 13,962.

Mont-de-Marsan, tn., cap. dep. Landes, France, 65 m. s. of Bordeaux. It has a mineral spring, and manufactures resin and oil. Pop. (1901) 11,604.

and oil. Fop. (1991) 11,007.

Mont-Dore-les-Bains, wat.pl., dep. Puy-de-Dôme, France,
on the Dordogne R., 8 m. s.e.
of Rochefort, and in the midst of
Mont Dore Mts. It has hot springs,
which were used in the time of the
Romans. Pop. (1901) 2,092.



Monte Carlo from the Tête de Chien.

its pottery. There is a Renaissance cathedral, completed in 1739. Ingres, the painter, was a native. The inhabitants warmly embraced the reformed religion, and endured four sieges in 1562, and another, lasting for three months, in 1621. After the revocation of the Edict of Nantes, Louis XIV. demolished its fortifications, and sent the most zealous of its Protestant professors to the galleys. Montauban, however, still maintains a Protestant theological college, the only one of the kind in France. Pop. (1901) 30,506.

Montauban. See Cousin-Montauban. military command of Canada, and stemmed the English invasion at Fort George and at Fort William Henry, which he captured, and at Ticonderoga, where he beat back General Abercrombie's army. On the Plains of Abraham he fell mortally wounded in battle against General Wolfe. Statues of Montcalm and Wolfe have been erected on the battlefield. See F. Martin's Le Marquis de Montcalm and Wolfe (1884).

Montceau - les - Mines, tn., dep. Saône-et-Loire, France, 25 m. s.w. of Châlon-sur-Saône. In the Blanzy coal district, it has iron foundries, machine shops, Montebello. (I.) CASTEGGIO, vil., prov. Pavia, Lombardy, Italy, 12 m. s.w. of Pavia. Here, in 1800, the Austrians were defeated by the French under Marshal Lannes, and again in 1859 by the allied French and Piedmontese. Pop. (1901) 2,176. (2.) Village, prov. Vicenza, taly, 10 m. s.w. of Vicenza, was the scene of two defeats of the Austrians by Napoleon in 1796. Pop. (1901) 4,669.

Monte Carlo, th., principality of Monaco, 9 m. N.E. of Nice, overlooking the Mediterranean, 1 m. N.E. of Monaco. With an exquisite climate, charming views, beautiful gardens, and, above all, the casino, it is one of the

chief resorts of the Riviera. Roulette and trente-et-quarante are the games played, and strangers are admitted for the day on presentation of visiting card. In 1898 the company who run the gaming-tables agreed to pay the Prince of Monaco a total sum of £1,000,000 in 1899 and 1913, and an annual contribution of £50,000, rising to £100,000 in 1937, the agreement to terminate in 1947. Pop. (1900) 3,794. See also Mo-NACA.

Monte Cassino, Italy. See Cassino.

Montecatini, two watering-places, Tuscany, Italy. (1.) In Lucca prov., 30 m. by rail w.n.w. of Florence. Pop. (1901) 8,863. (2.) In Pisa prov., 5 m. w. of Volterra. Pop. (1901) 5,009. Monte Cristo, small rocky isl.,

The cathedral dates from the 16th century. The church of San Flaviano is an interesting double church, whose earlier part dates from 1030. Montefiascone is celebrated for Muscat wines. Pop. (1901) 9,371.

Monteflore, SIR Moses HAIM (1784-1885), Jewish philanthropist, was born at Leghorn; became one of twelve Jewish brokers allowed on the London Stock Exchange, and partner and brotherin-law of Baron M. N. Roths-child. He founded the Alliance Insurance Company and Provin-cial Bank of Iteland; was sheriff of London (1837); and made a baronet (1846). He was the champion of the Jews throughout the world. See Life by Lucien Wolf (1884); Diaries of Sir Moses and Lady Montefiore, ed. Loewe (1890).



Montenegro.

2,110 ft. in alt., off w. coast of Italy, 27 m. s. of Elba; has been a penal sottlement since 1874. See Dumas's The Count of Monte

Cristo (1844). Montecuculi, RAIMONDO, Count (1608-80), imperialist general, born near Modena. Entering the imperial army in 1625, he took part in the Thirty Years' war; defeated (1658) the Swedes, who had invaded Denmark, and in 1660-4 the Turks, who had inwaded Transylvania. He commanded the imperial troops on the Rhine (1672-6) against Turenne and the Prince of Condé. He left interesting Mémoires Militaires (1703). See Life, in German, by Grossmann (1878).

Montefiascone, walled tn., prov. Rome, Italy, s.E. of Lake Bolseno, 9 m. N.W. of Viterbo.

Montefrio, fort. tn., Granada prov., Spain, 25 m. w.n.w. of Granada; manufactures cottons

and soap. Pop. (1900) 10,725.

Montegut, EMILE (1825-95),
French critic, was born at Limoges. He succeeded Gustave Planche (1857) as critic for the Revue des Deux Mondes journal; in 1862 he went on the staff of the Moniteur Universel. He translated Macaulay's History (1861). Shakespeare's Works (1861), Shakespeare's Works (1872), and Emerson; and wrote Essais sur la Litt, Anglaise (1883) and Ecrivains Modernes de l'Angleterre (3 vols. 1885-92).

Monteleone (anc. Hipponium), tn., prov. Cantanzaro, Calabria, Italy, 31 m. w.s.w. of Cantan-zaro. It suffered from a disas-trous earthquake on Sept. 8, 1905. Pop. (1901) 13.481.

Montélimar (anc. Acusium), tn., dep. Dröme, France, 29 m. by rail s. of Valence; has silk and cotton factories, brick and tile works, and sawmills. Coal and lignite are mined. Pop. (1901) 13,351.

Montelius, OSCAR (1843), Swedish archæologist, born at Stockholm; professor since 1888 at the National Museum at Stockholm. Of his numerous works the chief are Sur l'Age du Bronze en Suède (1875); The Civilization of Sweden in Heathen Times (Eng. trans. 1888); The Age of Bronze in Egypt (Eng. trans. 1891); Les Temps Préhistoriques en Suède (1894); La Civilisation Primitive en Italie (1894); Zur ältesten Ge-schichte des Wohnhauses in Europa, speciell in Norden (1895); Die älteren Kulturperioden im Orient und in Europa (1903 f.); and vol. i. of Sveriges Historia

Montemayor, JORGE DE (1520-61), Spanish poet, born at Montemor in Portugal. His pastoral romance, Diana (1558; Eng. trans. 1598), became famous throughout Europe. An edition of his works appeared in 1886. See Schönherr's Montemayor (1886).

Montenegro (Serb, Crnagora, Turk. Karadagh, meaning Black Mountain'), an independent Slav principality on the Adriatic, between Dalmatia, Herzegovina, and Albania. Area, 3,630 sq. m. Its climate is hard, variable, and continental. The alluvial val-leys of the Zeta, Moracha, and Crmnica, the coast, and the shores of Lake Scutari are the most fruitful portions of the country, figs, olives, grapes, corn, pomegranates, and mulberries being cultivated. The mountains Kom Kuchi (8,165 ft.) and Durmitor (8,290 ft.) are the chief elevations. The Montenegrins are Servions of purest blood, and Greek Orthodox in religion. Agriculture and cattle-rearing are the chief industries. Exports (1903) valued at £120,000; imports, £220,000. The government is in the hands of a prince, who is assisted by a council of state. A representative parliament was established in December 1905. Since 1851 the ecclesiastical head (vladika) of Montenegro has been the bishop of Cettinje; before that it was the prince himself. Pop. 228,000, or 62 to the sq. m. Chief town, Cettinje (pop. 4,000). Montenegro in the 14th century was a de-pendency of Servia. It became a refuge for the fugitive Servians during the Turkish domination. From 1788 to 1896 the Monterom 1735 to 1335 the Monte-negrins co-operated in all the Russo-Turkish wars, and in 1878 their independence was acknow-ledged. See Coquelle's *Histoire* de Montinigro (1895); Denton's Montenegro, its People and their History (1877); Wyon and Prance's The Land of the Black Mountain (1903); Hassert's Reise durch Montenegro (1893); and Miller's Travels and Politics in the Near East (1898).

Montenotte, vil., Genoa prov., Italy, in Apennines, 32 m. w. of Genoa; was the scene of Napo-leon's first victory over the Austrians under D'Argenteau in 1796.

Montereau, tn., dep. Seine-et-Marne, France, at junction of Yonne and Seine, 12 m. s.E. of Fontainebleau; has manufactures of fine porcelain and fancy bricks. On Sept. 10, 1419, the Duke of Burgundy was assassinated on the bridge over the Yonne. Here Napoleon won his last victory over the allies in 1814. Pop. (1901) 7,929.

Monterey. (1.) Capital of state of Nuevo Leon, Mexico, 190 m. W. of Rio Grande; has smelting works, iron foundries, cotton factories, and silver mining; also Americans in 1846. Pop. (1900) 72,250. (2.) Seaside and winter resort in co. of same name, California, on Monterey Bay, 89 m. s.s. E. of San Francisco; was till 1847 the capital of California. Pop. (1900) 1,748.

Monte Rosa. See Rosa. MONTE.

Monte Sant' Angelo, tn., Foggia prov., Apulia, Italy, 27 m. N.E. of Foggia; has a castle and remains of a Roman temple. Its church of St. Michael is much resorted to by pilgrims. (1901) 21,997.

Montespan, Françoise Athk-NAIS DE ROCHECHOUART, MAR-QUISE DE (1641-1707), favourite of Louis XIV., born at Château Tonnay-Charente (Saintonge); became maid of honour at Versailles, and (1668) succeeded La Vallière in the king's affections. In 1691 she was superseded by Madame de Maintenon. Saint Simon. Madame de Sévigné, and Mignard testify to her beauty (she was fair, with blue eyes), and Voltaire to her wit. Her Mémoires appeared in 1829 (Eng. trans. 1895). See H. N. Williams's Madame de Montespan (1903).

Montesquieu, Charles DE SECONDAT, BARON DE LA BREDE ET DE MONTESQUIEU (1689-1755), was born in the Château de la Brède, near Bordeaux. His grand-father was judge of the Parlement, or supreme law court of Bordeaux, and the office was bequeathed to Charles in 1716. In 1722 he was deputed to act as spokesman in a remonstrance addressed to Louis xv., on the occasion of an edict of taxation which was presented for registration by the Parlement. His first published work, the Lettres Persanes (1721), was a daring

and subtle satire on the follies of the day, disguised in the form of letters from a Persian Having disposed of his noble. judgeship, Montesquieu was in 1728 elected to the Académie Française. He then devoted himself for some years to travel, and in 1734 he published his second great work, the Grandeur et Décadence des Romains; and ulti-mately, in 1748, his most famous book, the Esprit des Lois, a profound study of the legal and political institutions of the world. The book became, and still remains, a classic. There is a good edition of his (Euvres Completes, ed. Laboulaye (7 vols. 1875-9; Eng. trans. 1877). A new English translation of the Esprit des Lois, with D'Alembert's analysis, appeared in 1878. See Sir C. P. Ilbert's Montesquieu (Romanes Lecture, 1904), and Vian's Hist. de Montesquieu, sa Vie et ses Euvres (2nd ed. 1879).

Monteverde, CLAUDIO (1568 -

Ramirez and Pocitos are bathing-places. On the w. side of the bay is the Cerro (470 ft.), and at its foot are coaling stations and slaughter-houses. The outer harbour and entrance channel are being dredged to a depth of nearly 25 ft. The principal exnearly 25 ft. The principal exports are hides, wool, and preserved beef, the value during 1904 being £8,182,163; the imports, £4,514,190. Until 1814 Montevideo was in the possession of the Spaniards. In 1828 it became the capital of the re-

public. Pop. (1900) 266,000.

Montez, Lola, whose real name was Maria Dolores Eliza ROSANNA GILBERT (1818-61), Irish adventuress, was born at Limerick, and became a dancer and singer at Paris. At Munich (1846) she met King Louis of Bavaria, who gave her the title of Countess Landsfeld; but the troubles of 1848 drove her from the country. Eventually she settled in the United States, and died at As-



Montevidco.

1643), Italian musical composer, born at Cremona, and inventor of the 'freestyle' of composition. He first employed unprepared dissonances, which led the way to the greatest achievements of modern music. His opera Orfeo (1607) is based on the principle of accommodating music to the exigencies of the drama. He was musical director at Mantua (1603), and at St. Mark's, Venice (1613). Monte Vergine, Italy. See

VELLINO.

Montevideo, cap. of Uruguay, in 34° 54′ s. and 56° 12′ w., on E. side of a wide bay, is one of the best built cities in S. America. The most imposing buildings are the senate house, the cathedral, the university (over 400 students), national library and museum, the school of art, and the Solis theatre. Paso Molino is the most fashionable suburb, with a public park (El Prado); and Playa toria, Long Island, New York. See her Autobiography (1858), and The Story of a Penitent (1867)

Montezuma I. (?1390-1464), fifth Aztec sovereign of Mexico, succeeding in 1436; extended his power to the Atlantic and to the Pacific.

Montezuma II. (1466-1520), Aztec sovereign of Mexico, suc-ceeding in 1502. He pushed his conquests farther south, and on the appearance of Cortes vacil-lated, being misled by the ancient religious prophecies of his race. He was killed whilst a prisoner in Spanish hands.

Montferrat, Duchy or, for-merly an independent duchy of Italy, between Piedmont, Milan, and Genoa. After the disrup-tion of the Frankish empire it was ruled till 1300 by its own margraves. The house provided many crusaders, being celebrated as the defender of Tyre against

Saladin. The family became extinct in 1533. The duchy passed to the dukes of Savoy in 1631 and 1703.

Montfleury, ANTOINE JACOB (1640-85), French dramatist, born in Paris. Many of his subjects were borrowed from the Spanish. The two most famous of his plays, many of which are very licentious, are La Femme Juge et Partie and La Fille Capitaine.

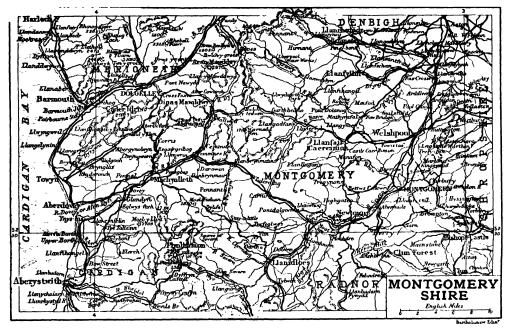
Montfort, SIMON DE, EARL OF LEIGESTER (? 1208-65), one of the outstanding figures in the development of the English constitution, was of French birth, but inherited his English title from his grandmother. In 1229 he came to England, and was con-

Parliament, in which all classes were represented. Simon de Montfort was unable to maintain his hold over the barons, and some of the more powerful went over to the king's side, as represented by the king's son Prince Edward. In 1265 the young prince and the supporters of the king defeated Montfort at Evesham, Montfort being killed. See Bémont's Simon de Montfort (1884).

Montgoffier. See Balloon.
Montgomerie, ALEXANDER
(?1540-?1605), Scottish poet, was
born at Hazelhead, Ayrshire. He
held some office under the Regent
Morton and James VI.; was apparently denounced a rebel (1597)

Herbert, the poet, was born here. Pop. (1901) 1,034. (2.) Town and dist., Lahore div., Punjab, India. The town is 92 m. s.w. of Lahore. Pop. (1901) 6,602. The district has an area of 5,754 sq. m., and a population (1901) of 463,585. (3.) City, Alabama, U.S.A., cap. of state, and co. seat of Montgomery co., on Alabama R., 155 m. N.E. of Mobile, with a great trade in cotton. Pop. (1900) 30,346.

Montgomery, FLORENCE SOPHIA (1843), English authoress, chiefly of children's books. Whyte-Melville induced her to publish her first book, A Very Simple Story (1866); then followed Misunderstood (1869), Thrown Tog ther (1872), Scaforth



firmed in his title and estates. He soon became a persona grata with Henry III., whose sister he married (1238). In 1258 the discontent then rife in the country came to a head, and the barons appeared in arms at the Parliament at Westminster. The result was the Provisions of Oxford, which admitted the barons to a share in the administration. 1261 the king repudiated the Provisions of Oxford, and eventually Simon de Montfort, at the head of the forces of the barons, defeated the king's army at Lewes (1264). After the battle a new agreement was drawn up, and in the Parliament which was to assist the king's council we find the prototype of the modern English for his connection with a scheme for the landing of the Spaniards. He is the author of the Cherrie and the Slac, the peculiar stave of which—prohably invented by him—was a favourite of Burns. He was probably the inventor of that variety of the sonnet known as the Spenserian. His collected Poems, ed. Laing, appeared in 1821: and they were issued by the Scottish Text Society, ed. Cranstoun (1887). See Dr. Hoffmann's Studien zu Alexander Mantgomerie (1894).

Montgomery. (1.) Market town, parl. bor. (with Llanidloes and others), and munic. bor., Montgomeryshire, England, 7 m. s. of Welshpool. A ruined castle overlooks the town. George

(1878), The Blue Veil (1883), Colonel Norton (1895), Tony (1897), Prejudged (1900), An Unshared Secret (1903), and The Wonderful Electric Elephant (1904).

Montgomery, GABRIEL, COMTE DE (1530-74), French knight, of Scottish origin, who accidentally killed Henry II. in a tournament. On the outbreak (1562) of the Huguenot wars he became one of the Protestant leaders. He escaped from the massacre of St. Bartholomew, and took refuge in England, whence he endeavoured, but unsuccessfully, in 1573, to succour Rochelle; and in the following year he was forced to surrender at Domfront in Normandy, and was executed in Paris.

Montgomery, James (1771-1854), Scottish poet and hymnwriter, was born at Irvine in Ayrshire, and joined the staff of the Sheffield Register (1792), becoming editor and proprietor (1795), when the paper was renamed the Sheffield Iris. He suffered fine and imprisonment for seditious utterances in his newspaper (1795 and 1796), which he continued to edit till 1825. His poetical writings are generally of a religious character, and his collected works contain, among other poems, The World before the Flood (1812), Greenland (1819), and The Pelican Island (1826). He also wrote many hymns, the best known of which are For ever with the Lord and Songs of praise the angels sang.

Montgomery, ROBERT (1807-55), English poet and preacher, was born at Bath. The success of his first poem, The Omnipresence of the Deity (1828), enabled him eventually to take orders (1835), and finally he settled at Percy Street Chapel, London (1843). His chief poems are The Messiah, Sacred Meditations, and The Sanctuary. He is best known for Macaulay's scathing criticism of him in the Edinburgh Review

Montgomeryshire, inland co. of Wales, 35 m. long, 40 m. broad, and nearly 800 sq. m. in area. The Vyrnwy, on Merionethshire border, forms the Liverpool corporation reservoir (5 m.

Montholon, Charles Tristan, MARQUIS DE (1782-1853), French general, born at Paris; served in the campaigns of Napoleon, to whom he was passionately attached, and whom he accompanied to St. Helena. Years later he was imprisoned with Louis Napoleon in the fortress of Ham (1840-8). He published Récits de la Captivité de Napo-léon (2 vols. 1846), and, with Gour-gaud, Mémoires pour servir à l'Histoire de France sous Napo-

léon (8 vols. 1822-5).

Monti, Vincenzo (1754-1828), Italian poet, was born at Fusig-nano, near Ravenna, and went in 1778 to Rome, where he be-came secretary to Prince Braschi, During the French republic he was professor of eloquence at Pavia, and during the empire he became Napoleon's official poet and historiographer for Italy at Milan. When the Austrians resumed their sway he lost all his posts and the chair. Monti was the most eclectic of Italian poets. His tragedies contain many fine passages, and were very popular (the Aristodemo was rendered into English four times); his shorter poems are often things of great beauty, and his translation of the *Iliad* was a remarkable achievement for one ignorant of Greek. He is now chiefly remembered as the author of that wonderful imitation of Dante, the Bassvilli-ana (Eng. trans. by Boyd 1805, Lodg de Cordova and gives its name to Amontillado sherry. Coarse linen and earthenware are manufactured. Pop. (1900) 13,603.

Montluc, Blaise De Lasseran SEIGNEUR DE (1503-77), marshal of France, was born near Condom in dep. Gers. His most famous exploits were the victory of Cérisoles, and the defence of Siena (1555) against the imperial troops. He fought vigorously against the Huguenots in Guienne, and was made marshal in 1573. He wrote Mémoires (new ed. 5 vols. 1865-72).

Montluçon, tn., dep. Allier, France, on Cher, 45 m. N.W. of Clermont - Ferrand; has blast-furnaces and iron works, and en-gineering shops. Mirrors are a specialty. Pop. (1901) 35,062.

Montmartre, height (320 ft.) and quarter within the fortifications of N. Paris. It is a Sunday resort, mainly because of the ancient burial-ground. Literary men and artists frequent its taverns—e.g. the 'Chat-Noir.'

Montmorency, riv., Quebec, trib. of St. Lawrence. At its mouth are the Montmorency Falls, which supply electric power to Quebec, 8 m. to the 8.w.

Montmorency, ANNE, DUC DE, (1493-1567), marshal of France, the friend and military companion of Francis I., with whom he was made prisoner by the insperialists at Pavia (1525). He then helped to negotiate the treaty of Madrid, and became grand master of the royal house-

fifths of the county is under permanent pasture. Lead and blende are mined, and slate and lime-stone are quarried. Flannels are manufactured, chiefly around Llanidloes and Newtown. It returns one member to the House of Commons. Pop. (1901) 54,892. The county town is Montgomery. Earthworks abound in the Severn valley, and Offa's Dyke crosses the border.

Month, the interval of time between one new moon and the Its mean length 29 53059 days varies, owing to the eccentricity of the lunar and ter-restrial orbits, to the extent of thirteen hours. Specifically, this is called the 'synodic month;' the 'sidereal month,' or the period of the moon's revolution marked by the stars, has an average duration of 27'32166 days. A year comprises 12'369 synodic or 13'369 sidereal months. The 'anomasidereal months. The 'anoma-listic month,' or the time of the moon's revolution from perigee to perigee, is 27.55460 days. The 'nodical month' of 27.21222 days is the interval between the moon's passage of and return to the same node.

(Proposta di alcune correzioni ed aggiunte at vocab. delta Crusca, 1817-26). His works were collected (1839 and 1858-83). See monographs by Canth (1879), Vicchi (1879 et sec.), Zumbin (1894), Garavini (1889), Masi 1897), Kerbacker (1897), and Giudetti (1901).

Monticelli, ADOLPHE (1834-86), French historical, genre, and portrait painter, was born at Marseilles. After studying at the Academy of Fine Arts in his native city he went to Paris, and settled there till 1870. The last sixteen years of his life, during which he was mentally deranged, were spent at Marseilles. work is chiefly remarkable for its colour, conceptions, and combina-tion of tints. His Court of Henry III. and the Miraculous Draught of Fishes are characteristic works. See Gouirand's Monticelli (1900).

Montignies-sur-Sambre, tn., Hainault prov., Belgium, 30 m. 8.8.E. of Brussels; has coal mines and iron works. Pop. (1900) 18,440.

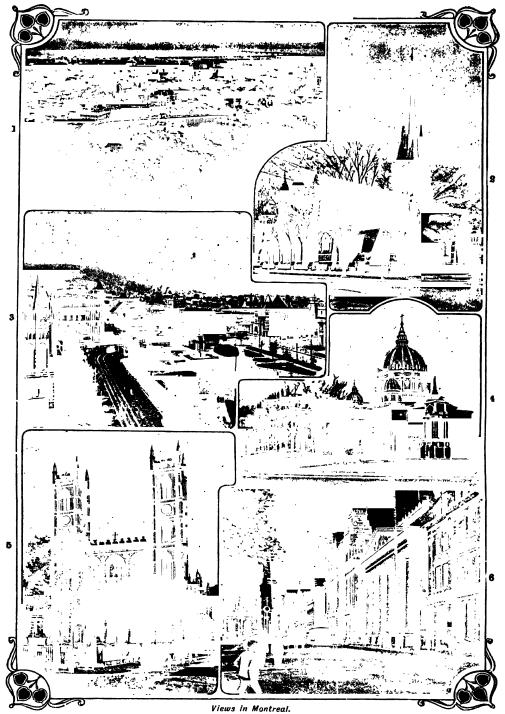
Montilla, city, prov. Cordova, Spain, 23 m. s.s.E. of Cordova; has ruins of palace of Gonzalvo He was recalled in the reign of Henry II., and in 1557 was de-feated at St. Quentin and made prisoner by the Spaniards. In 1562 he commanded the royal army against the Huguenots, but was defeated and captured at Dreux; and was again defeated in 1567 at St. Denis, where he received a fatal wound. See Life,

received a latal wound. See LT?, in French, by Decrue (1885-9).

Montmorency, HENRI, Duc DE (1595-1632), grandson of Anne, constable of France, was born at Chantilly, and won distinction in the religious wars against the Huguenots, in which he took (1625) the islands of R6 and Olfron during the siege of La Rochelle. He was made marshal in 1630, but incurred the enmity of Richelieu, who contrived that he should be mixed up in the rebellion of the Duke of Orleans. Montmorency was defeated and taken prisoner at Castelnaudry by the royal forces, and beheaded. See Life by Ducros (1643).

Montoro, city, prov. Cordova,
S. Spain, 24 m. E.N.E. of Cordova,
Ougalousing accounts.

on Guadalquivir, crossed by a famous old bridge (16th century), and is a centre of olive-oil produc-



View from Mount Royal.
 Christ Church Cathedral.
 Dominion Square.
 St. James's Cathedral.
 Notre Dame Cathedral.
 St. James's Street.
 (Photos by Notman.)

tion. There are medicinal springs (July-September) and numerous

Roman, Gothic, and Moorish remains. Pop. (1900) 14,581.

Montpelier, city, Vermont, U.S.A., co. seat of Washington co., and cap. of the state, 35 m. s.e. of Burlington. It has a magnificent capitol, also granite quarries. Pop. (1900) 6,266.

Montpellier, cap. tn. of dep. Hérault, France, 31 m. by rail s.w. of Nîmes, and 6 m. from the Gulf of Lions. It is a wine centre, and has silk culture. There are also manufactures of blankets, soap, and candles. Montpellier owns not only the oldest botanic garden in Europe, but one of its most famous universities, constituted in 1289. Moorish physicians Memoirs (best ed. 1858) are of great interest. See Barine's La Jeunesse de la Grande Made-moiselle (1901), and Louis XIV. et la Grande Mademoiselle (1905).

Montreal, city, Canada, at the junction of the Ottawa R. with the St. Lawrence, and on the N. side of the St. Lawrence. It stands at the head of ocean navigation, nearly 1,000 m. from the ocean, and at the commencement of the Canadian system of inland navigation. It is the seat of a university. In 1901 the population was 267,730, and in 1906 was estimated at 352,000, 'larger estimated at 352,000, 'larger Montreal' being put at 405,000. The harbour has been greatly extended since 1895. Montreal has woollen and cotton, boot and cupied by the Americans (1776-77). The riot of 1847 resulted 77). The riot of 1847 resulted in the destruction of the parliamentary buildings by fire, and the removal of the seat of government to Quebec.

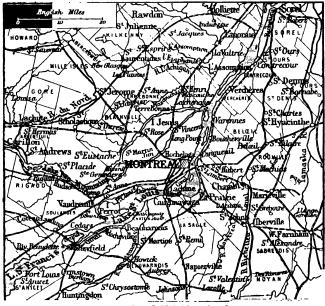
Montreuil, or Montreuil-sous-Bois, tn., dep. Seine, France; is an E. suburb of Paris, immediately N. of Vincennes. It is celebrated for its culture of peaches; manufactures colours, glue, varnish, and soap; and contains a beautiful 13th-century church. Pop. (1901) 31,773.

Montreux, a group of villages
- Clarens, Vernex, Territet stretching along the N.E. shore of Lake of Geneva, in canton Vaud, Switzerland, between Vevey and Villeneuve, and visited as winter resorts. Permanent population. 13.750.

Montrose, parl. and roy. bur., seapt., and par., Forfarshire, Scotland, on E. coast, at mouth of S. Esk, 34 m. s.w. of Aberdeen. It is a fishery headquarters. Flaxspinning and timber trade are the principal industries. The drawing about 19 ft. Total trade, £200,000 annually. It unites with Arbroath and other towns to return one member to the House of Commons.

(1901) 12,427.

Montrose, James Graham, FIFTH EARL AND FIRST MARQUIS OF (1612-50), known as the 'Great Marquis,' succeeded his father as fifth earl in 1626. In the autumn of 1637 he joined the national movement, and on the renewal of the National Covenant in 1638 became one of its prominent champions. In 1639 he was sent north into Aberdeenshire, and quickly smothered the active opposition to the covenant, and routed the Gordons at the Bridge of Dee on June 18. In 1640 Montrose led the van of the Scottish army that crossed the Tweed, and won the victory of Newburn, near Newcastle. But having rashly bruited his suspicions of Argyll's aims, he was in 1641 sent a prisoner to Edin-burgh Castle. He was set at liberty on the king's arrival later in the same year; and thenceforth he gave himself heart and soul to the royal cause. On the Scots invading England early in 1644, he obtained a commission to be licutenant-general for the king in Scotland, and was created Marquis of Montrose. Then Marquis of Montrose. Then having roused the Highlands, he dashed upon a force of 6,000 men under Elcho at Tippermuir (1644), and routed them so effectually as, in the words of Sir Walter Scott, to appal the Presbyterian courage, even after the lapse of eighty years.' Then repairing to Aberdeen, he fell upon another force under Lord Gordon.



Montreal and Neighbourhood.

founded the school of medicine and science, with which are associated the names of De Villeneuve, Rabelais, Rondelet, Bauhin, Magnol, Tournefort, and De Jussieu. At the university, too, Petrarch was a student and Casaubon a professor. The town has a cathedral. Pop. (1901) has a cathedral. 75,950.

Montpensier, ANNE MARIE LOUISE D'ORLEANS, DUCHESSE DE (1627-93), called 'La Grande Mademoiselle,' daughter of Gaston d'Orléans, brother of Louis XIII., was born at Paris. woman of restless ambition and great courage, she hoped to be-come queen of France, but finally married Count Lauzun. During the troubles of the Fronde she sided with the Frondeurs. Her shoe factories, breweries, iron foundries, railway works, clothing, sugar, and tobacco factories. French form more than half of its population. The city, which is predominatingly Roman Catholic, contains many fine churches, notably the cathedral of Notre Dame, St. James's Cathedral, St. Patrick's, and the church of the Gesu. The Anglican cathedral, Christ Church, is said to be the finest specimen of Decorated Gothic in America. M'Gill Uni-versity is housed in fine buildings. When Jacques Cartier sailed up the St. Lawrence in 1535, he found here the Indian town of Hochelaga. In 1760 Montreal surrendered to the English un-der Lord Amherst. During the war of independence it was oc-

after which he pillaged the town. By rapid movements and clever feinting he then succeeded in getting past Argyll into Argyll's own country, which he burned and devastated; and finally he, in 1645, completely routed Ar-gyll's followers at Inverloohy. He next defeated a force double the size of his own at Auldearn; and later enticed the troops of Baillie into hopeless toils at Alford. Following Baillie southwards, he again routed him at Kilsyth; and having virtually disposed of all armed resistance in Scotland, he was proceeding towards the Borders, when he was surprised and overthrown at Philiphaugh by the cavalry of David Leslie. After the surrender of Charles to the Scots he set sail from Stonehaven, and ultinately joined Charles II. at the Hague. Having received from him a commission (1649) as lieutenant-governor of Scotland, he set sail in December, but was routed at Invercarron (1650). Escaping from the field of battle, he took refuge in Sutherlandshire; but was given up to the government by Macleod of As-synt, and after trial for treason he was condemned to death, and ignominiously hanged at Édin-burgh on 21st May, his body being afterwards quartered and the limbs affixed to the gates of the principal towns of Scotland. This cruel fate was caused by the hatred which the Covenanters bore him. See Wishart's Memoirs of James, Marquis of Montrose (1639-50; ed. Simpson and Murdoch, 1893); Mark Napier's Life and Times of Montrose (1840), Memorials of Montrose (1850), and Memories of Montrose (1856); and Mowbray Morris's Montrose (English Men of Action Series, 1892

Mont St. Michel, granite islet, connected with the mainland by a causeway (1 m.) in 1880-1, in Mont St. Michel Bay, off coast of dep. Manche, France, 15 m. S.E. of Granville. It is high and steep, is crowned by a Benedictine monastery of 11th to 13th century, and is surrounded by ramparts with towers. The bay is about 15 m. wide, and 8 m. from north to south. It is dry at low water, and is noted for its quicksands and rapid tides. Pop. (1901) 235.

Montserrat, one of Leeward Is., British W. Indies, 34 m. N.W. of Gaudeloupe. It is 11 m. long and 7 m. broad, and has an area of 37 sq. m. It is of volcanic origin, the highest summit being Souffrière (3,000 ft.). Among itschief products are sugar, coffee, cocoa, arrowroot, and lime juice. The total trade amounts to about \$33,000. The island was colonized by the British in 1632. but

was French in 1664-8 and 1782-4. Pop. (1901) 12,215. Its capital is Plymouth. Pop. (1901) 1,461.

Montucia, Jean Etienne (1725-99), French mathematician, was born at Lyons. He held various posts under the revolutionary government. His Histoire des Mathématiques (1758; new ed. 1799-1802) was long the standard authority. Amongst other works are Histoire des Recherches sur la Quadrature du Cercle (1754) and Magie Squares (Eng. trans. 1893).

Montyon, Jean Baptiste Antoine Auget, Baron De (1733-1820), French philanthropist, born at Paris; became muître des requêtes to the Council of State (1760), administrator in Auvergne (1767-75), and chancellor to the Comte d'Artois (1780). He is best known for his generosity to the Paris hospitals, and for his foundation of the Montyon prizes— (1) 10,000 francs for the best means of rendering a mechanical art less unhealthy; (2) for any improvement in surgical or medical art; (3) for any book conducive to morality; (4) for an act of virtue performed by a poor Frenchman. The prizes are of the same value, annual, and divisible, and were founded in 1780. See *Life*, in French, by Labour (1881); and *Prix de Vertu*, by Taillandier (1877).

Monumental Brasses, large plates of brass or latten, bearing effigies or symbols, and usually fixed in the pavement of churches. They are also found let into the walls and into the sides of altartombs. Occasionally the outline of the brass itself represented the figure of the person commemorated: much more frequently the effigy or symbolic design was incised on the metal, and originally it was rubbed in with some black resinous substance, the armorial bearings also being set with an enamel in their appropriate colours. Fine specimens are known on the Continent considerably before the 13th century, during which period the art began to flourish in England. Among the earliest specimens in England is the brass at Stoke Dabernon, Surrey, on the monument of Sir John d'Aubernon (c. 1277); one at Trumpington, Cambridgeshire, to Sir Roger de Trumpington (1289); and one at Buslingthorpe, Lincolnshire, to Sir Richard de Buslingthorpe. All these very early English brasses bear signs of having been executed by one artist. The 14th and earlier 15th century displayed both the most vigorous representations and the most numerous; the fullness and precision with which, in many of these, the vestments of ecclesiastics, the armour of the military, and the habits of laymen are reproduced

constitute them records of priceless value to the antiquary. Among the best may be named the brass of Archbishop Cranley, at New College, Oxford (1417); of Bishop Goodrich in Ely Cathedral (1554); of Peter de Lacy, at Northfleet, Kent (1375); of William Byschopton, Great Bromley, Essex (1432); of Sir Thomas Cheque, at Drayton Beauchamp, Berks (1368); of Sir John and



Monumental Brass of Sir John d'Aubernon at Stoke Dabernon.

Lady Delapole, at Chrishall, Essex (1370); of Sir Ivo. Fitzwaryn, at Wantage, Berks (1414); of Judge and Lady Martyn, at Graveney, Kent (1436); and of Sir John de Saint and Lady Quintin, at Brandsburton, Yorkshire (1397). Though no small number of brasses has somewhat recently been discovered in the northern counties, it is in Kent, Essex, Oxfordshire, and Norfolk

that they chiefly abound. See Boutell's Monumental Brasses (1849), the Oxford Portfolio of Brasses (1898), Haines's Manual of Monumental Brasses (1861).

Monuments. See PROTECTION OF ANCIENT MONUMENTS.

Monza, tn., Lombardy, Italy, 10 m. N.E. of Milan, ancient cap. of Lombard sovereigns. The famous iron crown of Lombardy is preserved in the cathedral, founded in 595. The town hall dates from 1293, and the royal palace from 1777. The town has manufactures of coarse cottons, hats, leather, and silk; also dye works. In 1900 King Humbert of Italy was assassinated here.

Pop. (1901) 42,124. Moody, Dwight Lyman (1837-99), American evangelist, was born at Northfield, Massachusetts. In 1856, while in business at Chicago, he established a accompanied by Ira D. Sankey, he visited Britain, and instituted revivalist services. The two organized similar meetings in the United States (1875). They collaborated in a hymn-book for use in these services, and Moody published The Second Coming of published The Second Coming of Christ (1877); The Way and the Word (1877); Secret Power (1881); The Way to God (1884). See Lives by W. R. Moody (1900), A. W. Williams (1900), and H. Drummond (1900).

Moody, FANNY, English soprano singer, was born at Redruth, Cornwall. She came to London and studied under Ma.

London, and studied under Madame Sainton-Dolby; and made her debut in the Carl Rosa Opera Company as Arline in the Bo-hemian Girl. She was four years prima donna in the Royal Italian Opera under Sir Augustus Harris, and has scored great successes at concerts and in oratorios. Since 1897 she has sung with the Moody-Manners Opera Company, inaugurated by her husband, the bass singer. Charles Manners.

Mooitan. See MULTAN.

Moon, a heavenly body revolving round the earth at a mean distance of 238,840 miles, in a period of 27 days 7 hrs. 43 min. 11 5 secs. The phases of the moon, since she shines by reflected sunlight, depend upon her continually changing positions with regard to the sun and earth. Full and new moon occur respectively when the sun and moon are aligned oppositely, and on the same side of our planet. At quadratures the moon appears half illumi-nated or 'dichotomized;' she is said to be crescent in the first and fourth, 'gibbous' in the second and third quarters. Full moon-light is estimated to be of strans the intensity of sunlight; but it decreases much more rapidly than

the extent of bright surface, owing to the lengthening of mountain shadows with the more oblique incidence of light. Lunar heating effects were first detected by Melloni in 1846. They are due in part to the direct reflection of the sun's thermal rays, in part to their absorption and re-emission as obscure radiations far down in the infra-red spectrum. Hence a large proportion of the moon's heat can be stopped by a thin plate of glass. Its total amount was put by Hutchins at 181000 that of the sun. The temperature of the lunar surface, considered by Langley to rise scarcely above the freezing point of water, has been shown by Very, in accordance with Lord Rosse's earlier view, to fluctuate probably from above 100° C. at lunar noon to - 200° during the long lunar night. The absence of an atmosphere intensifies this frigid condition. The suddenness with which stars vanish when occulted by the moon and the blackness of its shadows, testify to an all but totally denuded state; yet twilight gleams near the cusps were perceived by Professor W. H. Pickering at Arequipa, involving, he thinks, the action of a gaseous remnant about as tenuous as our air at an elevation of forty miles (Harvard Annals, xxxii. 82). He has also alleged plausible evidence of the alternate deposition and disappearance of hoar-frost round crater orifices; but there is certainly no liquid water on our satellite. The large dusky patches, called by Galileo maria, are depressed plains. Aqueous influences are unapparent even in the 'rills' or fissure-like markings, of which some hundreds have been enumerated. At present the moon is a magnified reproduction of the Phlegræan Fields of S. Italy. There is, so to speak, not standing room for all the erreters it has preduced. all the craters it has produced; many are confluent and mutually encroaching, and their number, according to Pickering, exceeds 200,000. The largest, named 200,000. The largest, named after the French astronomer Bailly, is 180 m. across; and their diameters range down to one mile or less. The craters Copernicus and Gassendi measure respectively 64 and 58 m., and have depths of about 19,000 and 8,000 ft. Tycho, near the south pole, is the focus of a great system of 'rays,' divergent streaks, resembling lava-filled dykes, running straight along for hundreds of miles. Other craters have similar adjuncts.

The lunar surface is broken, not only by innumerable vents and fissures, but by ten distinct mountain ranges. The highest peak, situated in the Leibniz

chain, rises to 30,000 ft., and summits exceeding 18,000 ft. are fairly common. Altogether, 479 craters and peaks have received names. Although their aspect names. Attrough their aspect changes greatly with the angle of illumination, their structural forms seem invariable. Slight alterations of tint only are discernible in certain localities; and Pickering conjecturally explains the 'variable spots' by the growth and decay of some low form of vegetation, dependent upon the emission of vapours of water and carbonic acid from adjacent craterlets.

The mass of the moon being that of the earth, is relatively far the greatest belonging to any satellite in the solar system. corresponds to a diameter for the lunar globe of 2,162 m., and a mean density of 3.44 (water = 1). Its apparent diameter varies from 33' 30" at the minimum distance 33' 30' at the minimum distance of 221,614 m., to 29' 21" at the maximum of 238,840 m. The parallax of the moon, at its mean distance of 60'27 terrestial and the state of the state of 50'27 terrestial and 50'27 terre trial equatorial radii, is 57' and the earth subtends at the lunar surface an angle of about 2°. Our satellite has a volume 办, an area of less than 🔥 the terrestrial; and lunar gravity has one-sixth its power at sealevel. Its feebleness may in part explain her atmospheric destitution, since, by the kinetic theory of gases, the 'critical velocity' of 1½ m. a second, or the greatest controllable by the moon, is frequently surpassed by the flying particles of oxygen and nitrogen. Our view of the moon, apart from the effect of librations, is limited to a single hemisphere. She keeps the same face always turned inward, because her rotation, on an axis deviating 11° from perpendicularity to the ecliptic, proceeds synchronously with her revolution. Kant was the first to recognize (in 1754) that this coincidence must have been brought about by the primitive action of tidal friction.

The lunar orbit has an eccentricity of 0.0549, and is inclined 5° 8' to the plane of the ecliptic. It is traversed with a velocity of 0.635 m. a second, and the moon shares, besides, the earth's orbital speed of 18'5 m., thus pursuing a resultant path everywhere concave towards the sun. Her daily motion, referred to any star, is about 13° 11'; the interval between two of her transits is, on an average, 51 m. longer than a mean solar day: and her meridian altitude has a range of 57° 12'-i.e. twice the range of 57° 12'-i.e. twice the inclination of the earth's equator plus twice that of the moon's orbit to the ecliptic. And because the seasonal relations of altitude are inverted for the full moon.

which is necessarily in opposition to the sun, we see it ride high in the wintry heavens, while attaining but a small elevation in summer.
The lunar theory is not ideally

gible. Solar disturbance tends, on the whole, to pull the moon away from the earth; it lessens the effective attraction between them by about wie: and the sidereal month is hence nearly

perturbation. The moon's track, accordingly, expands and contracts in a period of one year; and the moon by turns gets ahead and falls short of her mean place by 11'. This, her 'annual

S



Photograph of the Moon.

perfect. With the 'problem of three bodies' mathematical analysis is incompetent to deal exhaustively. Approximation has indeed been carried to a high point; yet the outstanding errors, though minute, are not neglione hour longer than it would be if the sun were removed. The result, however, ensues unequally, in consequence of the eccentricity of the earth's orbit, which occasions an alternate approach to and retreat from the source of

equation, was discovered by Tycho Brahe. A second effect of perturbation is the revolution of the line of apsides. It advances, on the whole, despite interruptions and regressions, at such a rate as to carry it completely round in 8'855 years. The nodes of the lunar orbit, on the other hand, shift backward, though irregularly, through the sun's influence, performing an entire circuit in 18'6 years. Abul Wafa (940-98) possibly, Tycho Brahe certainly, detected the 'variation' by which the moon, in the course of each lunation, hurries forward to the extent of 39½, and falls back by the same amount in the opposite octants. The 'parallactic inequality' has the effect of elongating the moon's orbit on the side next the sun, and flattening the averted half. Its precise evaluation supplies a measure of the sun's parallax.

some 25,000 years the process will be reversed, as the terrestrial path regains a more oval shape.

Galileo constructed the first map of the moon; one by Tobias Mayer, with parallels and meridians, was published in 1775; and detailed charts by Lohrmann, Beer and Mädler, Schmidt, and Neison appeared in 1824 to 1878. The actual system of lunar nomenclature was originated by Riccioli in 1651. Lunar photography was successfully prosecuted in America from 1850 by Bond, H. Draper, and Rutherfurd, and in Britain by De la Rue. Its systematic organization at the Lick observatory by Holden in 1890

BCHICKARD 0 00 0 OCEANUS 1115 0 COPALLAS. CARPATHIAN MARE ARISTARCHUSO O MARE IMBRIUM RORIS SINUS ALEXANDERO EUDOXUS C LLEY PLATO HAUPERTUIS MARE FRIGORIS

Key to Photograph of the Moon.

The evection is conditioned by the eccentricity of the lunar path. All these perturbations were explained by Newton on gravitational principles in 1687. One, however, the 'secular acceleration,' discovered by Halley in 1693, seemed unaccountable until Laplace showed in 1787 that the progressive diminution in the eccentricity of the earth's orbit involves a corresponding enfeeblement of the sun's disturbing power, permitting the moon to draw continually nearer to the earth, and to travel faster. She has hence gained in longitude by about 1° since the beginning of the Christian era. But after

prompted the construction of the Paris Photographic Atlas of the Moon, accompanied, in its progressive publication, by selenological discussions, in which MM. Loewy and Puiseux sought to establish the relations in time and circumstance of the different lunar formations. The first complete photographic lunar atlas was issued by W. H. Pickering in 1903, in eighty plates, on a scale of 160 miles to the inch (Harvard Annals, vol. li.). See Pickering's The Moon (1904), Nasmyth and Carpenter's The Moon, as Planet, World, and Satellite (new ed. 1885), and Neison's The Moon (1876).

Moon, WILLIAM (1818-94), English philanthropist, born at Horsemonden, Kent, who, having become totally blind at twenty-one, invented the embossed type which bears his name. The alphabet consists of eight Roman letters unaltered, and twelve with parts left out, the remainder being designated by new and simple forms. Dr. Moon established home-teaching societies to search out the blind, teach them to read, and lend books to them free of cost. There are now (1906) eighty of these in Great Britain, and fourteen in other countries.

Moon-eye, or GOLD-EYE (Hyodon tergisus), a bony fish abundant in the lakes and rivers of N. America. It grows to a length of from one foot to eighteen inches. There are many peculiarities of structure, on account of which the fish, which is the only member of its genus, forms a family by itself.

Moonta, munic. tn., co. Daly, S. Australia, on Spencer's Gulf, 102 m. N.w. of Adelaide; formerly yielded much ct pper. Pop. 7,000.

Moonwort (Botrychium lunaria), a British fern, with a curious, characteristic form and habit. It has two branches of its frond, one leafy and the other fertile, the pinna of the former being fan-shaped or crescentshaped. The vernation is straight. It is almost a stemless plant. The moonwort occurs abundantly on open heaths and peaty pasture land. In cultivation it is important to leave its roots undisturbed, and to provide it with a well-drained peaty soil.

Moore, ALBERT JOSEPH (1841-93), English decorative painter, born in York, brother of Henry Moore, the marine painter. He exhibited at the Royal Academy in 1857, and was elected an Associate of the Royal Society of Water Colour Painters in 1884. He turned to ancient sculpture and renaissance art for the outer garments in which to clothe the reposeful figures of his dreamland; and produced great decorative formal beauty, remote from human emotion, and has been called the poet of drapery. The Birmingham, Liverpool, and Tate (London) galleries have paintings by him. See A. L. Baldry's Albert Moore (1894).

Moore, EDWARD (1712 57), English dramatist and miscellaneous writer, was born at Abingdon, Berkshire. His chief work is the traged yof The Gamester (1753), produced by Garrick. Moore was editor of, and wrote a number of ingenious parodies and many essays for, the World (1753-7).

Moore, Frank Frankfort

Moore, Frank Frankfort (1855), British novelist and dramatist, was born in Limerick. He travelled through S. Africa, Burma, W. Indies, and S. America (1876-92). After publishing a volume of verse, Flying from a Shadow (1875), he devoted himself to fiction and journalism. Among his most successful novels are: The Mutiny on the 'Albatross' (1885), I Forbid the Banns (1893), A Grey Eye or So (1893), The Jessamy Bride (1897), The Fatal Gift (1898), A Damsel or Two (1902), Rachel's Escape (1904), Sr Royer's Heir (1904), The White Causeway (1905), and He loved but One (1905). His plays are Kitty Clive (1895), A March Hare (1877), Broken Fetters (1881), and Oliver Goldsmith (1892).

Moore, George (1851), British novelist, born in Ireland; came, in Paris, under the influence of Flaubert, Maupassant, and especially Zola, whose devoted disciple he became. His novels are strongly realistic. The chief are A Mummer's Wife (1884), Esther Waters (1894), Evelyn Innes (1894), The Untilled Field (1903), and The Lake (1905). He has also written on Modern Painting (1893), condemning the mode of construction in Britain, and attacking the Academy and other

institutions.

Moore, Henry (1831-96), English marine painter, born at York, the brother of Albert Moore. His first important seascape was exhibited in 1858, and thereafter he devoted himself to a study of sea and sky, especially to varieties of wave form and colour. His 'wild blue wastes' of lonely water were for long not appreciated by landsmen. He was elected A.R.A. in 1885, R.A. in 1893, and in 1889 his Clearness after Rain gained the Grand Prix in Paris. His Catspaw off Land is in the Tate Gallery, London. See P. G. Hamerton, in Portfolio (1890).

Moore, John (1729-1802), Scottish physician and author, was born at Stirling. Settling in London, he published A View of Society and Manners in France, Switzerland, and Germany (1779), followed by a similar work on Italy in 1781. In 1786 appeared his masterpiece, Zeluco, a powerful and successful novel. He wrote two other novels, a biography of Smollett (1797), and works on the French revolution. He was father of Sir John Moore. See Life, by Dr. Robert Anderson (1820); and Mooriana (1803), by Prevost and Blagdon.

Moore, SIR JOHN (1761-1809), British general, was born at Glasgow. He served in the W. Indies and Ireland (1798), and under Abercrombie took part in the Egyptian campaign (1801). In 1808 he was sent to Spain, and was raised to the chief command. The success of the French forced him to make the disastrous retreat from Astorga to Corunna.

During the retreat his soldiers suffered greatly from the climate, and from the attacks of the pursuing army under Soult. When they arrived at Corunna, the British had to face about and fight the French before they could embark. Moore was shot in the moment of victory, and was buried in the citadel of Corunna. See Wolfe's famous verses on the Buriat of Sir John Moore; Life by J. C. Moore (1833); and Diary of Sir John Moore, ed. by J. F. Maurice (1904).

Moore, LILIAN DECIMA, English prima donna, was born at Brighton. She made her début as Casilda in The Gondoliers, at the Savoy Theatre, in 1889. She has since appeared in leading parts at the Savoy, Prince of Wales's, Shaftesbury, Court, Trafalgar (Duke of York's), and Criterion theatres; and has sung with marked success in the United States and Australia.

Moore, Mary, English actress, was born in London; first appeared on the London stage as Lady Dorothy in The Candidate (Criterion Theatre). So marked was her success that she was given the rôle of Lady Oldacre (1885), and has since been Sir Charles Wyndham's leading lady, playing the heroine in Wild Oats, David Garrick, The Two Roses, London Assurance, The Case of Rebellious Susan, The Liurs, and Mrs. Gor-

ringe's Necklace. Moore, Thomas (1779-1852), Irish poet, was born in Dublin. Proceeding to London, his personal charm (which, all his life through, was the secret of much of his popularity) gained him influen-tial friends, and in 1803 he was appointed Admiralty registrar at Bermuda. He tired of the work there in a year, and left it to be done by a deputy, who involved him, fourteen years later, in serious difficulties by embezzling some £6,000. Except for some verses published in 1801 under the pseudonym of 'Thomas Little,' his first publication was Epistles, Odes, and other Poems, in 1806. This, with Corruption and Intolerance (1808) and The Sceptic (1809), was too much an imitation of existing models to give any real scope to his powers; but in 1807 Moore began the publica-tion of his *Irish Melodies*, which contain his best work, for he was there thoroughly in sympathy with his subject. Altogether, ten numbers of the Melodies appeared between 1807 and 1834. Lalla Rookh, his other most notable work, a laboriously elever 'Oriental' poetical romance which delighted the public, appeared in 1817, and ran through six editions in the same year. For a time he made a new success, after this, with political squibs such as The

Fudge Family in Paris (1818), Fables for the Holy Alliance (1823), and Odes on Cash (1828); but his prosperity was interfered with by his being obliged to live on the Continent to avoid arrest on account of the Bermuda embezzlement. Through the help of friends the matter was at length settled. The Epicurcan, a prose romance after the style then in vogue, but prepared as carefully as Lalla Rookh, appeared in 1827; a life of Sheridan in 1825; an edition (with a biography) of Byron's Letters and Journals in 1830; a life of Lord Edward Fitzgerald in 1831; and a History of Ireland (in 4 vols.) in 1835-46. After that his mental powers and his health collapsed. His Poetical Works were published in 1840; his Memoirs, Journals, and Correspondence, edited by Earl Russell (8 vols.) in 1835-56; and Lives by H. R. Montgomery (1860) and by S. Gwynn (1905).

Moor-hen. See RAIL.
Moorings, a place where a ship rides, either at her own anchors or attached to permanent ones. In a harbour there are commonly 'chain moorings'—i.e. a collection of anchors, chains, bridles, and swivels, to which ships may attach themselves. 'Swinging moorings' consist of a buoy supporting a cable which is made fast

Moorland, an association of plants in 'which peat is an important element. In the driest localities heath predominates, and it is termed a 'heath;' when the soil is wetter and Sphagnum becomes more significant, it is a 'heather moor;' where the land is still moister, the living Sphagnum is very important, and it is called a 'sphagnum' or 'moss moor;' and where cotton grass flourishes, a 'cotton-grass moor.'

In the Pennines of England the cotton-grass moors have peat from 5 to 10 or even 20 to 30 ft. thick, while in the heather moors it is usually browner and drier, and less than 5 ft. thick. Such moors are practically confined to the colder parts of the globe, for in warmer lands decomposition is more rapid than growth. Once begun, however, owing to anti-septic acids in the peat, the growth is rapid, unless these are drained off. An impervious soil, a high annual rainfall, and, in hilly and mountainous districts. the excessive amount of clouds and mists, with the consequent diminution of bright sunshine, are conditions which favour the growth of those plants which live in and extend the area of stagnant places, and are therefore factors in peat formation.' In the bogs of Ireland, where low lying, the plant associations are not quite

the same as those of the high moors. The edge of a moor tends to be lower than the centre when the growth is freer. For the utilization of moors, see PEAT. utilization of moors, see PRAT. See C. E. Moss's 'Peat Moors of the Pennines,' in Geog. Jour. (xxiii., May 1904); T. Johnston's 'The Irish Peat,' in Question Econ. Proc. R.S. (i., 1899); Larbelètrier's La Tourbe et les Tourbières (1900); Miall's 'A Yorkshire Moor,' in Nature (lvii., 1898)

Moors a mixed rece of N

Moors, a mixed race of N. Africa, containing an Arab or Semitic element, and a Berber or Hamitic element, represented by the Kabyle tribes, which are chiefly nomadic. Historically the Moors are best known as the invaders and conquerors of Spain. (See CALIF, and SPAIN.) These Arab invaders cultivated the art of architecture; in the study of philosophy and science, and above all of mathematics, they had no rivals. Industry and commerce flourished under them. But their period of efflorescence was short. See S. Lane Poole's The Moors in Spain (1887); S. P. Scott's History of the Moorish Empire in Europe (3 vols. 1904); and Calvert's Moorish Remains in Spain (1906).

See Mur-Moorshedabad.

SHIDABAD.

Moor Steamship Line possesses 25 steamers, of 85,165 tonnage, and is managed by Messrs. Walter Runciman and Co., of Newcastle-on-Tyne. It was founded originally as the South Shields Steam Shipping Company in 1889, its name being changed as above in 1897. The company has a capital of £300,000, and acts as cargo traders to all parts of the world.

Moorup, or MOORUK, a species of cassowary (Casuarius bennetti) found in New Britain.

Moose. See Elk.

Moose Factory, a Hudson's
Bay Company trading post, on
James's Bay, Ontario, Canada.

It is the objective point of a railway from Sault Ste. Marie, and is the see of the bishop of Moosonee.

Moose Jaw, tn., prov. Sas-katchewan, Canada, 48 m. w. of Regina. Pop. (1901) 2,042.

Moot-hill. See FOLKMOOT. Moplas, or MAPILLAS, a lowcaste people of the Calicut dis-Malabar coast, India; ruddy-black colour, with black wavy hair and somewhat regular features. All are Mohammedans. and claim descent from Arab immigrants. They now speak a Malayálim (Dravidian) dialect, and are the most enterprising people on the Malabar coast. The term Mopla (Moplay) is also applied collectively to the Laccadive islanders, who are likewise Mohammedans, and of Malayalim speech. The same name is extended even to the Christian and Jewish communities of the Cochin district.

The true Moplas numbered nearly 1,000,000 in 1903.

Moquegua,tn., Moquegua dep., Peru, 85 m. s.E. of Mollendo. It has suffered frequently from earthquakes, especially in 1715 and 1868. Pop. (1896) 5,000.

Mora, in Scots law, means undue delay, which may disentitle a party to the assistance of the court. The corresponding English term is laches. See Acquiescence.

Moradabad, or MURADABAD, munic. tn., cap. of dist. of same name, United Provinces, India, on r. bk. of Ramganga R., 50 m. N.W. of Bareilly. Noted for engraved metal ware and cotton It has ruins of Rustam goods. It has ruins of Rustam Khan's fort, dating from founda-tion of the town in 1625. Pop. (1901) 75,128. Area of dist., 2,281

sq. m.; pop. (1901) 1,191,993.

Moræa, a genus of hardy and half-hardy South African plants belonging to the order Iridacea. Many bear flowers of great beauty.

Moraines. See GLACIATION. Morales, Ambrosio (1513-91). Spanish historian, was appointed official chronicler, and continued the chronicle of Florian de Ocampo to the 11th century (1574-8, 5 vols.; republished with 5 vols. of Morales's other historical works, 1791-3). His historical material was afterwards utilized by Sandoval and Garibay.

Morality, or MORAL PLAY, a type of popular drama which arose at the end of the 14th or the beginning of the 15th century. was similar to the miracle play, but the characters were abstractions instead of the personages of Scripture history or saintly legend, and the action illustrated such themes as the dance of Death, or the struggle of vices and virtues for the soul of man. The carliest moralities seem to have been known as Paternoster plays; but of these none are preserved. Of those which still exist, the most important are The Pride of Life, Mankind, Everyman (recently revived with great success), Magnificence, by Skelton; and The Satire of the Three Estates, by Sir David Lindsay. The name is given also to such of the professional interludes of the 16th century as have abstractions, wholly or in part, as dramatis persone. See Hazlitt-Dodsley's Old English Plays (1874-6; vols. i.-iii., vi.); A. W. Pollard's Miracle Plays, Moralities, and Interludes (ed. 1898); J. M. Manly's Specimens of Pre-Shakespearean Drama (1897; vol. i.); A. Brandl's Quellen des Weltlichen Dramas in England vor Shakespeare (1898).

Moral Philosophy. See ETHICS.

Morar, tn., Gwalior state, Central India, 3 m. N.E. of Gwa-lior. Pop. (1901) 19,179.

Morat, or MURTEN, tn., Swiss canton of Fribourg, on S.E. shore of Lake of Morat (10½ sq. m. in area). Here the Swiss completely routed (June 22, 1476) the forces of Charles the Bold, Duke of Burgundy. Pop. (1900) 2,263.

MORATE OLYMPIA (1596-55)

Morata, OLYMPIA (1526-55), Italian scholar, born at Ferrara; lectured in Latin and Greek in her sixteenth year. Having mar-ried Andreas Gründler, a German physician, she died a lecturer at Heidelberg, leaving numerous Latin and Greek poems, a commentary on Homer, dialogues, treatises, and letters. See Bornet's Olympia Morata (1865).

Moratalia, tn., prov. Murcia, Spain, 40 m. n.w. of Murcia, has manufactures of rough cloth, soap, and alcohol. Pop. (1900) 12,689.

Moratin, LEANDRO FERNANDEZ DE (1760-1828), Spanish poet and dramatist, born at Madrid; was a protege of Jovellanos. Lived much in France and England, and became official translator at the Spanish Foreign Office. His lyric poetry, though charming, is overshadowed by the fame of his dramas—El St de las Niñas, La Mojicata, El Viejo y la Niña, and cthers that still hold the stage. His critical colnote the spage. In critical collection of Spanish plays, with a history of the Origin of the Spanish Stage (1838), is useful and scholarly. Moratin's Letters have recently been published by the National Libertin 1841. National Library in Madrid, and collections of his works are common (6 vols. 1830-31). Having accepted office under Joseph Bonaparte, Moratin died in exile.

Morava, RIVER. See MARCH. Moravia (Ger. Mühren), mar-gravate of Austria, covers 8,583 sq. m., and is bordered W. by Bohemia and E. by Hungary. It is intersected by spurs of the Sudetic Mts. and the Carpathians, and is traversed by the river March, which runs into the Danube. The capital is Brünn (pop. 1900, 108,944). Poultry, especially geese, are reared. Coal, cially geese, are reared. Coal, iron ore, and graphite are found. Its industries comprise the manufacture of woollen, linen, and cotton goods, the production of beet sugar, alcohol, beer, cigars, and cigarettes. For its history see under Austria and Bohemia. Pop. (1900) 2,435,081, principally Czechs (95 per cent. being Roman

Catholics). Moravians, or MORAVIAN BRETHREN, a society of Christians, traceable to a body formed in Moravia in the 15th century, who call themselves the Unitas Fratrum (Church of the Brethren, and are also known as Herrn-huters (Ger. Mührische Brüder). The Council of Basel (1433) having caused a complete separation between the two parties of Huss-ites (see Huss)—viz. the Calixtines

and the Taborites - the former drew back to the Roman Catholic Church, while the latter formed themselves into a distinct community, under the name of the Bohemian and Moravian Brethren. Their first bishop was ordained in 1467, and the union rapidly increased under the leadership of Lucas of Prague, till, in 1500, it numbered some four hundred congregations. They lived in friendly intercourse with Luther, but their doctrine and practice leaned more to those of the Reformed Church. All along they suffered great persecution (the war of Schmalkald, 1546), and in the Jesuit counterreformation they were practically exterminated (c. 1617), their last bishop being Komensky (Come-nius). About a hundred years afterwards the remnants of the brotherhood were led by Christian David into Silesia, where they received a habitation from Count Zinzendorf. This settlement became Herrnhut—i.e. The Lord's Watch'-and here, in 1727, was organized the first church of the modern Moravians. The movement spread_in Germany, also to England and ica. At present these and America. present three provinces show a total of some 100,000 adherents. Many of the ancient features are maintained -c.g. the great attention paid to education, the strict discipline, and especially the zeal for foreign missions, in which they were the modern pioneers. In all the Moravians have had considerably more than 2,000 agents in various mission fields during their 170 years—a remarkable work for so small a church. In their several settlements they have about 150 stations, with 400 European and native missionaries, besides assistants, and close upon 100,000 members. They have also 240 day schools, with some 29,000 scholars; 110 Sunday schools, with an aggregate roll of 39,000. They maintain a leper home at Jerusalem, established in 1867. See History by Bp. Schweinitz (1885): Moravian Schweinitz (1885); More Schools and Missions (1889).

Moray, James Stewart, Earl of (?1531-1570), regent of Scotland, natural son of James v. by Lady Margaret Erskine. In September 1549 he repulsed a French descent on the coast of Fife. He signed the letter to Knox in March 1556 inviting him to return from Geneva; and he was one of the few Scottish Protestant nobles whose piety was beyond suspicion. Having joined the Lords of the Congregation in their active opposition, in 1559, to the queen regent, he acted with great promptness and energy, and entered Edinburgh on 29th June: and it was mainly through his diplomacy that aid was given by Elizabeth which counterbalanced that obtained by the queen regent from France, and led to the signature (July 8, 1560) of the treaty of Edin-burgh, providing for the removal of foreign troops from Scot-land. After the return of Queen Mary to Scotland the administration of affairs was mainly left in Lord James's hands; and on Jan. 30, 1561-2, she conferred upon him the earldom of Moray. Although he aimed at effecting a reconciliation between Elizabeth and Mary, he resolutely opposed Elizabeth's offer of Leicester as a husband for Mary, unless conjoined with a guarantee of Mary's rights of succession. But when Mary suddenly brought matters to a crisis (1565) by giving her hand to Darnley, Moray resolved to take up arms against his sister; but was compelled to take refuge in England. He returned to Scotland (1566) after the murder of Rizzio; but the escape of Mary to Dunbar frustrated his designs. In April 1567 he obtained permission to leave the kingdom. During his absence the queen was induced to resign the crown, and he was chosen regent. On the escape of Mary from Loch Leven (1568) he raised a strong force against her, with the result that she was defeated at Langside. He continued to govern the country with great prudence and skill until he was shot dead by Hamilton of Bothwellhaugh at Linlithgow.

Moray Firth, arm of North Sea, in N.E. of Scotland, about 78 m. broad, and lies between Duncansbay Head in Caithnessshire and Kinnaird's Head in Aberdeenshire. It is noted for its fishing. It runs s.w. for nearly

24 m. Morayshire. See Elginshire. Morbinan, French dep., the s.e. portion of Brittany, lies along the N. shore of Bay of Biscay. It includes Belle Isle, and the whole coast is much indented. The extensive heaths and many stagnant pools give the district a general look of sombre desolation. The climate, owing to maritime influence, is most equable. The passage of the stage of the ble. The peasants breed cattle and keep bees. Cider is made. The fisheries (especially of sardines) and oyster culture are important. Morbihan has a great number of ancient stone monu-ments. The capital is Vannes, but the most important town is I. Orient. Area, 2,738 sq. m. Pop. (1901) 563,468.

Mordants, compounds capable of uniting with dye-stuffs to form insoluble pigments, and thus, if the reaction is made to take place in the fibres of a fabric, fix the colour in it. Mordants are mostly used in cotton and wool dyeing, and are commonly solutions of salts of iron, aluminium, chromium, and tin. It is sufficient to boil a woollen fabric with the salt solution—e.g. alum—to get sufficient of the required com-pound deposited in the fibres; whilst in the case of cotton, the salt—e.g. ferrous acetate—is soaked into the fabric and there decomposed by the action of steam or water, or in other cases by sodium carbonate, as when cotton is mordanted with chromium by soaking in chrome alum solution, followed by reaction with the solution of a second salt. See DYEING.

Mordvins, a Finnish people of E. Russia, numbering in all about 750,000. They are of moderate height, robust and endur-ing, with dark or auburn hair, blue eyes, round heads, oval faces, fair skins. Till the middle of the 18th century they were usually pagans; now almost all are nominal Christians.

More, HANNAH (1745-1833), English poetical and ethical writer, was born at Stapleton, Gloucestershire. An acquaint-ance with Garrick led to two plays of hers being produced at Covent Garden-Percy in 1777, and The Fatal Falsehood in 1779. After Garrick's death she set her face against the stage; and Sacred Dramas (1782) are a link between her earlier writings and the ethical works that followed-Slavery (1788), The Religion of the Fash-ionable World (1790), On Female Education (1799), Calebs in Search of a Wife (1809), Practical Piety (1811), Christian Morals (1813), (1811), Christian Morals
On the Character of St. Paul
(1815), Moral Sketches (1818), The pleasant style with which she propounded a very reasonable system of pious living deserved the popularity it gained for her writings. She was tireless in writings. She was writings philanthropic work, particularly with respect to children. Her Collected Works were published, in 11 vols., in 1830; and Lives by H. Thompson (1838), Charlotte Yonge (1887), and M. Harland (1900).

More, HENRY (1614-87), English theologian and philosopher, born at Grantham, Lincolnshire. Revolting from boyhood against Calvinism, he turned to Christian Platonism, holding that holiness was the way to knowledge, but later declined into vague mysticism. He wrote Psychozia Platonica, a Song of the Soul (1642, new ed. 1647). His bestknown prose works are Divine Dialogues (1668); Mystery of Godliness (1660); Enchiridion Ethi-cum (1667); Opera Omnia (1679). See Life by Ward (1710); Rational Theology, by Tulloch (1874); and Poems, by Grosart (Chertsey Worthies Library, 1878).

More, SIR THOMAS (1478-1535). Lord Chancellor of England, was born in Cheapside, London. At Oxford he was a pupil of Grocyn and Linacre, and above all of Colet, with whom he formed a close friendship. In London he met Erasmus, and for him conceived a memorable affection. More lectured in Grocyn's church on St. Augustine, and at Furnival's Inn on law. In 1514 he was associated with Tunstall in a commission to the Netherlands, in the interests of the London merchants. He was appointed Speaker (1523) of the House of Commons. On the fall of Wolsey More became chancellor (1529). On the questions of the royal supremacy and the divorce he was at variance with Henry VIII.; and when the Annates Act was passed (1532), depriving the Pope of the first year's income from benefices, More resigned the great seal. He was accused of



Sir Thomas More.
(Photo by Walker & Cockerell.)

taking bribes. That charge fell completely to the ground; but the fatal topic was the royal supremacy. This More would not acknowledge. He was committed to the Tower (1534), and, found guilty of high treason, was beheaded (July 6, 1535). The serenity and even the homely wit, which were part of his character, he carried with him to the scaffold. His household at Chelsea, where he lived in patriarchal fashion, has been described by Erasmus and painted by Holbein. He wrote a life of Pico della Mirandola and of Richard III. (of the latter Shakespeare has made use). He was a skilful epigrammatist in Latin; his controversy with Tyndale on the translation of the New Testament was of moment; his Memorare Novissima inculcates a practical but sombre piety.

By far his most important work was Utopia (1516; ed. J. Churton Collins, 1904), a sketch of an ideal commonwealth, wherein religion is a pure theism, toleration is almost absolute, a sort of communism is established, and social life is regulated according to the dictates of right reason, as that reason presents itself to the natural man. The work was written in Latin; the earliest and best-known version in English is that by Ralph Robynson (1551). The Church of Rome has canonized him. See *Lives* by William nm. See Lives by William Roper, his son-in-law (1626; ed. 1902); Cresacre More, his great-grandson (1631); by Stapleton, in Tres Thome (1588); by Lord Campbell, in Lives of the Chancellors; by Father Bridgett (1891); by Mark Pattison, in Encyc. Brit. (9th ed.); by W. H. Hutton (1895).

348

Morea, peninsula, Greece (anc. Peloponnesus), known in the middle ages by the above name. See GREECE.

Moréas, Jean (1856), French poet, born at Athens, of Greek extraction, his real name being Papadiamantopulos; settled in Paris in 1877. He published in 1884 Les Systes, the first of that series of works and manifestoes in virtue of which he has been called by M. Anatole France 'one of the seven stars of the new Pléiade, the Ronsard of symbolism.' His most notable volumes of verse are Les Cantilènes (1886); Le Pèlerin Passionné (1891); Eriphyle (1894); Poésies, ISSG-1896 (1898); Les Stances (1898-1901).

Moreau, GUSTAVE (1826-98), French painter, symbolical and romantic, born at Paris. His early manner was founded on Delacroix; his later on Mantegna and Da Vinci. His Ectipe et le Sphinx (1864) provoked fierce criticism; also his Jeune Fille avec la Tête d'Orphée (1867; Luxembourg). He treated Biblical subjects in an Oriental spirit, influenced by the subtle art of Persia. His house in Paris, now national property, contains a valuable collection of his work. His water colour L'Apparition is now in the Luxembourg.

Moreau, Jean Victor (1761-1813), French general, was born at Morlaix in Brittany. He served under Dumouriez in 1793, and was chosen general of division in 1794. He then served with Pichegru, and when his chief fell into disgrace he received (1796) the command of the Army of the Rhine. Although he drove back the Austrians beyond the Danube, the defeat of Jourdan left him unsupported, and he conducted his army back to the Rhine in a masterly retreat. His next command was over the army of Italy, which he extricated

from a dangerous position. He was offered the dictatorship by the party which overthrew the Directory, but refused it, while he lent Bonaparte his support in his coup d'état. By Bonaparte he was appointed again to the command of the Army of the Rhine, and he drove the Austrians headlong before him, defeating them at Hohenlinden (1800). great popularity and reputation made him an object of suspicion to Napoleon, by whom he was accused of participating in the plot of Cadoudal. He was degraded, and sentenced to two years' imprisonment, which was commuted to banishment. settled in the United States, whence he returned in 1813 to assist the allies against Napoleon. He was mortally wounded before Dresden, and died shortly afterwards at Laun in Bohemia.

Morecambe, wat.-pl. and munic. bor., N.W. Lancashire, England, on Morecambe Bay, 3½ m. from Lancaster. It possesses a three-mile promenade, two pleasure piers, winter gardens, Alhambra Palace and Theatre, and is a popular resort. Pop. (1901) 11,798.

Morel, the name of a group of the Morchella genus of fungi. They include a number of most delicately flavoured species, of which the common morel (Morchella esculenta) is one of the best. This species is generally of a yellowish-gray colour, and is of firm substance. It has a very wrinkled, roundish head, about two inches in diameter, supported on a stock about two inches high. Morels are found in woods, and are much commoner in Germany and the adjacent countries than in Britain. If dried, morels will keep for many months.

Morelia, or Valladolid, cap. of state of Michoacan, Mexico, 125 m. w.n.w. of Mexico City. It has a cathedral, two colleges, cotton factories, and pottery works. It produces sugar. It is the birthplace of General Morelos. Pop. (1900) 37,487.

Morella, fort. tn., prov. Castellón de la Plana, Spain, 36 m. w.s.w. of Tortosa; has manufactures of blankets and sashes. Pop. (1900) 7,335.

Morelli, GIOVANNI (1816-91),

Morelli, Giovanni (1816-91), Italian patriot and critic, born at Verona; laboured for Italian freedom, and, as parliamentary deputy, fathered the Morelli Act, prohibiting alienation of art treasures. In 1873, under the pseudonym 'Ivan Lermolieff,' he commenced a series of attacks upon Italian art criticism, which had the effect of revolutionizing critical methods, and introducing scientificatudy of detail and form. He wrote Die Werke italiemischer

Meister in den Galerien von München, Dresden und Berlin (Eng. trans. 1883), and Della Pitturia italiana (Eng. trans. (1892-3). See Domenico Morelli

nella Vita e nell' Arte (1906). Morelos. (1.) State of Mexico, s. of the federal state of Mexico, 2,773 sq. m. in area. It is mountainous in the N.; the S. valleys are very fertile, producing grain, sugar, coffee, and fruit. The capital is Cuernavaca. Pop. (1900) 161,697. (2.) Town in state of Nuevo Leon, Mexico, 52 m. s.e.

of Monterey. Pop. 9,000.

Morena, SIERRA, mt. range (7,900 ft.) of S. Spain, dividing the valleys of the Guadiana and

the Guadalquivir.

More - pork (Podurgus Cuvieri), a bird belonging to the
night-jar family, which is found
in Tasmania, and oversits popular name to its peculiar cry. See

NIGHT-JAR.

Moreri, Louis (1643-80), French writer, born in Provence; became a noted preacher at Lyons. In 1674 he published his Grand Dictionnaire Historique. His book, which was translated into English, is still valuable from a biographical point of view. The 20th ed., printed in Paris in 1759, is considered the best.

Moresnet, tn. and neutral territory, between the Rhine Prov., Prussia, and Liège prov., Belgium, 5 m. s.w. of Aix-la-Chapelle. It has been under the joint control of the two govern-ments since 1816. Lead and zincmining and hat-making are carried on. Pop. 3,000.

Moresque Architecture. See SARACENIC ARCHITECTURE.

Moreton Bay, chief harbour on E. coast of Queensland, Australia, 40 m. by 17, is formed by the islands of Bribie, Moreton, and Stradbroke, and the mainland. Captain Cook discovered it in 1770.

Moreton Bay Chestnut, a tree belonging to the genus Cas-tanospermum, a subdivision of the order Leguminosæ. C. australc, a native of Queensland, is the only species. It is a tall growing tree, bearing long pinnate leaves and bright yellow and red papi-lionaceous flowers, followed by long brown legumes, each containing four roundish seeds, which are sometimes roasted and caten.

Moreto y Cabaña, Agustin (1618-69), Spanish dramatist, born at Madrid. A disciple of Calderon, he equalled his master in stage craft and excelled him in comicality. His types are in comicality. His types are irresistible satirical portraits, and several of his plays still hold the stage, especially El Desden con cl Desden (Eng. trans. Love's Victory, 1825), one of the finest comedies in existence. His best plays are included in Moratin's collection, and in that of Rivadeneira (vols. xxxix. and liv.).

Moretto, IL whose true name was Alessandro Bonvicino (c. 1498-c. 1555), Italian painter, born at Rovato; studied under Titian at Venice, latterly modelling himself upon Raphael. His masterpiece is the Assumption, in the church of San Clemente, Brescia. Four of his paintings are in the British National Gallery. See Molmenti's Il Moretto da Brescia (1898); and L'Opera del Moretto (ed. 1899).

Morfill, William Richard

(1835), English Slavonic scholar, has been professor and reader of Russian and the Slavonic tongues at Oxford since 1889, and is curator of the Taylor Institute. Mr. Morfill has published grammars of Polish (1884), Servian (1897), Russian (1889), Bulgarian (1897), and Bohemian (1899), and has contributed on Russian subjects to this Encyclopædia. He has also contributed to the Stories of the Nations Series Russia (1885) and Poland (1893), and has written Slavonic Literature (1883), and a History of Russia from Peter the Great (1902).

Morgagni, GIOVANNI BATTISTA (1682-1771), founder of pathological anatomy, was born at Forli; a pupil of Valsalva, whom he succeeded at Bologna; and from 1716 to 1771 professor of anatomy at Padua. His works began with Adversaria Anatomica (1706), and ended with the greatest of all— De Sedibus et Causis Morborum per Anatomen Indagatis, published in his eightieth year (Eng.

trans. 1769). Morgain, or Morgue LE FAY, sister of King Arthur and mother of Ywain, may be called the witch, as Merlin is the wizard, of Arthurian legend. In the charming English poem of Syr Gawayne and the Grene Knyghte she lays an elaborate plot to shame the queen, by discrediting the valour of the Knights of the Round Table. In her character of queen of Avalon, Morgain is represented as carrying off Arthur to be healed of his wounds. This does not accord with the malicious character elsewhere ascribed to her, and it seems probable that in the present confused account we have the blending of several distinct traditions - a sorceress versed in healing, a sea-goddess, and, it may be, a hint of Germanic influence.

Morgan, Augustus DE. See DE MORGAN.

Morgan, SIR GEORGE OSBORNE (1826-97). British politician and lawyer, was born at Gothenburg, Sweden. He was called to the bar (1853), and chosen M.P. for Denbighshire (1868). An advanced Liberal, to him are due the Burials Bill (opening churchyards to Dissenters' services), the Army Discipline Act, and the Married Women's Property Act. He became judge-advocate-general (1880), and in 1885, 1886, and 1892 again carried East Denbighshire. As under-secretary for the colonies in 1885-6 he founded the Emigration Inquiry Office. He was created baronet (1892).

Morgan, SIR HENRY (?1635-88), British buccaneer, was born in Glamorganshire, and became 'admiral' of the W. Indian buccaneers (1666). In 1668 Morgan ravaged Cuba, and crossing to the mainland, carried Porto Bello by assault, sacked the town, brutally tortured the inhabitants, and only withdrew on payment of an enormous bribe. For three years he continued this course of rapine and cruelty, but at length was sent to England in chains. There, having won Charles II.'s good graces, he was knighted and made lieutenant-governor of Jamaica (1675), where he died. See the narrative of his comrade Esquemeling, in Buccancers of America (1684).



John Pierpont Morgan.

Morgan, JOHN PIERPONT (1837), American banker, was born at Hartford, Connecticut. In 1891 he inherited a gigantic fortune from his father. two greatest commercial operations with which his name is associated are the Steel Trust and the Atlantic Shipping Com-bine. The former, which came into existence in 1901, has a captital of \$1,432,000,000, and is said to be the most gigantic financial combination of any age. The corporation controls 40 per cent. of the pig-iron industry of the United States, and owns or conship of the Pall Mall Gazette, which he had held since 1880. He then became editor of Macmillan's Magazine till 1885. Meanwhile he had written the series of biographies which won him his position in contemporary literature. These are Edmund Burke, an Historical Study (1867); Voltaire (1871); Rousseau (1873); Diderot and the Encyclopædists (1878); and Richard Cobden (1881). His other chief works are: Critical Miscellanics (first series, 1871; second series, 1877); The Struggle for National Education (1873); On Compromise (1874); Burke (1879), in the English Men of Letters Series, of which Mr. Morley was editor; Walpole (1889), in the series of Twelve English Statesmen; Studies in Literature (1891); The Study of Literature (1894); Oliver Cromwell (1900); and Life of Gladstone (1903). Andrew Carnegie, having acquired the library collected by Lord Acton, presented it in July 1902 to Mr. Morley, who handed it over to the University of Cambridge.

Mr. Morley's active political career began in 1883, when he was elected for Newcastle-on-Tyne. In 1895 he was returned for the Montrose burghs. When Gladstone came into power in January 1886, Mr. Morley was appointed Chief Secretary for Iraland with cabinet rank. The for the Montrose burghs. When reland with cabinet rank. The government went out in July 1886, but both in the last Gladstoneadministration(August 1892-March 1894) and the first Rosebery ministry (March 1894-June 1895), Mr. Morley resumed his place at the Irish Office. He is credited with having brought about the conversion of Mr. Gladstone to Home Rule, or, at least, with having more strongly influenced him in that direction than anybody else, and during the debates on the second Home Rule Bill (1893) he played a part only second in importance to that of Mr. Gladstone himself. In December 1905, when the Liberal government took office, he was appointed Secretary of State for India. He was Romanes lecturer at Oxford in 1897.

Morley, SAMURL (1809-86), English politician and philanthropist, was born in London. Returned M.P. for Nottingham in 1865, but unseated on petition, he represented Bristol (1868-85), declining a peerage on his retirement. A great philanthropist, he granted liberal pensions to his workpeople, and gave large sums for Nonconformist objects.

Morley, THOMAS (1557-1604), English musician, pupil of William Byrd, was organist at St. Paul's Cathedral (1591-2), and afterwards a 'gentleman of the Chapel Royal' (1592-1602), and was granted a monopoly for printing music in 1598. His Plaine and Easie Introduction to Practicall Musicke (1597) was long the standard authority. He published several collections of his compositions, his madrigals and canzonets being peculiarly graceful, although suggestive of Italian sources. His original setting of 'It was a lover and his lass,' in As You Like It, still survives.

Mormon, BOOK OF, an alleged translation (1830) by Joseph Smith, jun., of a volume found buried in a stone box on Cumorah, a hill near Manchester, New York state. Composed of gold plates eight inches by seven inches, fastened by three golden rings, written in 'reformed Egyptian,' interpreted by the aid of two crystals (Urim and Thummim) set like spectacles in a silver bow, it summarized American history from Babel to 420 A.D. Its authors were the prophet Mormon and his son Moroni. A travesty of the Old Testament, and of similar travels as the Bible of lar size, intended as the Bible of the West, it has been identified by unbelievers with an unprinted romance, The Found Manuscript, by Solomon Spaulding (1761-1816), copied and communicated to Smith by Sidney Rigdon.

Mormon Church of Latter-day Saints, founded (April 6, 1830) at Fayette, New York, has its headquarters and chief temple (forty years in building, and dedicated 1893) at Salt Lake City, Utah, and three other temples in the same state, at Logan, Manti, and St. George. The Nauvoo temple (founded 1841) has been assigned by law to the 'Reorganized Church of Latter-day Saints, which seceded (1851), protesting against polygamy, Adam-God worship, and the right to shed the blood of apostates. This branch was headed (1860) by Joseph Smith, eldest son of the Prophet,' and reinforced by a son of Brigham Young. The Book of Mormon and Doctrine and Covenants form the basis of a belief which looks for a continuance of revelation and miracles, an American Zion, a millennium, and the palingenesis of earth under Christ's rule. Universal tolerance of other faiths, the literal resurrection of the body, baptism Universal tolerby immersion, and (by proxy) of the dead, are Mormon tenets. Industry and payment of debts are insisted on, and the social instinct and co-operative spirit are conspicuously developed. The Zion Co-operative and Mercantile Company is the most famous outcome of Mormon enterprise in trade, the Big Horn Valley colony (Wyoming) their most recent successful extension. Polygamy as a practice has been forbidden for the future. Two orders of priesthood exist-the higher that of Melchizedek, the lower that of Aaron. To the former belong apostles, seventics, high priests, elders, patriarchs; to the latter, bishops, priests, teachers, deacons. The first presidency (i.c. the president of the church and two counsellors) forms the highest authority, followed by the twelve apostles and seventies—a hundred councils of seventy each. These bodies supervise generally the church, which locally is organized into 'stakes' (fifty), further subdivided into 'wards.' Each 'stake' has a president and two counsellors; each 'ward' a bishop, teachers, and deacons.

Mormons, THE, numbering six persons in April 1830, now exceed 300,000, settled chiefly in Utah and the western states of the Union. Their founder, Joseph Smith, a farmer's son, born at Smith, a farmer's son, born at Sharon, Vermont (1805), was joined by Brigham Young, and founded at Kirtland, Ohio, a bank (1832), a temple and the first presidency (1833), the twelve apostles (1835), first foreign apostles (1835), first foreign mission (1837), and the secret society of Danites (1838). Here Smith and Rigdon were tarred and feathered (1832), the bank failed (1838), and Smith, accused of treason and murder Brigham Young's European converts arrived by the thousand, and in 1840 Nauvoo was founded under a charter, which gave Smith complete power; and a temple was begun (1841). In 1843 Smith razed to the ground the office of the Expositor, a journal which had attacked his polygamous ideas. Foster, the editor, took out a warrant for the arrest of Smith, who surrendered himself to avoid bloodshed. He and his brother Hyrum were shot in Carthage jail by a lawless mob (June 27, 1844). Forced to leave Nauvoo (1845-6), the Mormons trekked westward under Young's guidance, and reached the site of Salt Lake City (July 24, 1847). Sait Lake City (Suly 2s, 1871).
Young, the hero of the exodus, as Smith was of the genesis, of Mormonism, became president (1848); founded the Perpetual Emigration Fund (1849); was appearance of 11th University of 1840. pointed governor of Utah Territory (1850); maintained a successful struggle for independence with the Federal government (1850-60), during which a hundred and fifty Gentile emigrants were massacred (1867) at Mountain Meadows by Mormons and Indians, led by John D. Lee, afterwards executed (1877) for the crime. Young died in 1877. Since then there have been four presidents—John Taylor (1877-87), Wilford Woodruff (1889-87), Wilford Woodruff (1889-98), Lorenzo Snow (1898-1901) and Joseph F. Smith, nephew of

'the Prophet' (1901). During the period 1852-90 ten per cent. of Mormons married plural wives, for which 1,200 were fined or imprisoned, 12,000 disfranchised, and \$11,000,000 confiscated. Monogamist laws were accepted by the president and church conference (1890), acts of amnesty passed (1893-4), and Utah admitted as a state (1896). President Smith in 1904 pronounced against polygamy. See Life of Joseph Smith; The Mormons, by Mayhew (1851); Early Days of Mormonism, by Kennedy (1888); History of Utah, by Bancroft (1890); The Mormon Delusion, by Montgomery (1890); Mormon Saints, by Thomas (1890); Mn Summer in a Mormon Vision, by Merriam (1891); History of Salt Lake City, by Tullidge (1886); The Story of the Mormons, by Linn (1902).

Morning Post, The, the oldest of the London daily newspapers, was founded in 1772 as an uncompromising supporter of Toryism and the 'king's party.' Under the editorship of Henry Bate, it acquired an evil reputation for the coarseness and scurrility of its gossip, and for one of its libels Bate was sent to prison for twelve months, while Tattersall, the proprietor in 1788, had to pay \$\frac{2}{3}\$,000 for another libel on a lady of society. In 1795 the property was bought by Daniel Stuart. Its politics were converted to advanced Liberalism, and among its writers were S. T. Coleridge, Charles Lamb, and James (afterwards Sir James) Mackintosh. Southey and Wordsworth also published poems in the Morning Post. In 1803 Stuart sold the paper for £25,000, and from that point its influence declined. In 1820 it was principally the organ of the fashionable world and the favourite reading of the circles in which 'Major Pendennis' moved. In the 'fifties the Morning Post became the organ of Lord Palmerston. In 1875 Lord Glenesk (then Mr. Algernon Borthwick) became sole proprietor of the paper, with which he had been connected as manager or editor since 1851. In 1882 the price of the paper was reduced from threepence to a penny. It is now the principal Conservative organ in London

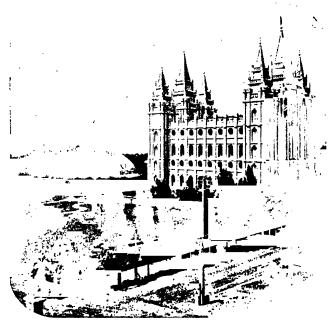
tive organ in London.

Morny, Charles Auguste
Louis Joneph, Count de (181165), French politician and diplomatist, was born at Paris, the
reputed son of Queen Hortense,
and consequently half-brother to
Louis Napoleon. He served in
the army in Algeria (1830-8),
and in 1842 he began his political career, and showed great
aptitude for finance and for
political intrigue. He was deeply
involved in the conspiracy which

resulted in Louis Napoleon's coup d'état, and was rewarded with a place in the ministry. In 1856 he became ambassador to Russia. From 1857 to 1865 he was president of the Legislative Assembly.

Morocco, or Marocco (called by the natives Maghrib et Aksa), (I.) The empire of Morocco occupies some 220,000 sq. m. of the N.w. corner of Africa. To the N. is the Mediterranean Sca, and to the w. the Atlantic Occan. At the Strait of Gibraltar it is 9 m. from Spain. The Atlantic coast-line, 450 m., extends to the Wadi Draa. Physically, Morocco may be considered a western extension of Algeria. The

apricots, almonds, and melons. The cereal crops include maize, millet, beans, chick-peas, canary-seed, cummin, and fenugreek. The exports, which go chiefly to Spain, France, and England, consist of cereals, wool, hides, cattle, fowls, eggs, wax, gums, oranges (to Seville), Tafilet dates, almonds, and apricot kernels, and in 1904 were valued at £1,684,013; while the imports were valued at £2,246,682. There are practically no roads or wheeled vehicles in the country. Morocco possesses three metropolitan cities—Fez, Marrákesh (Morocco city), and Mequinez. The following ports are open to



Mormon Temple and Tabernacle, Salt Lake City, Utah.
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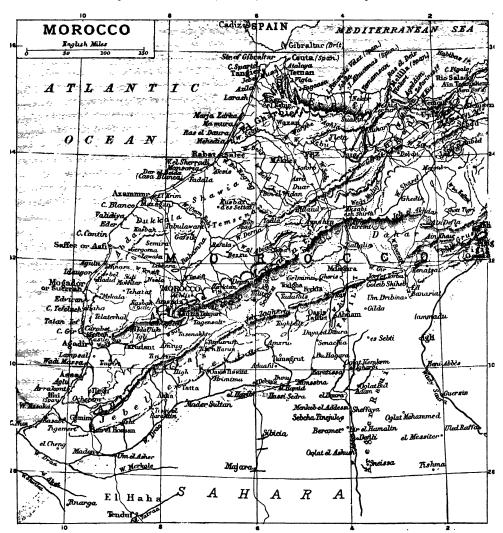
Atlas range (see ALGERIA), however, is higher, and in some cases covered with perpetual snow; the rivers are rendered unnavigable by sandbanks at their mouths. Between the mountains and the sea stretch rolling plains of great fertility, a small portion only of which is cultivated or inhabited. The mineral wealth is presumed to be considerable. The fruit-bearing trees include the date-palm, walnut, olive, and argan. Another tree for which Morocco is famous is the Citrus, or gum sandarach. Several other gum trees are grown, as also are oranges, lemons, grapes, pomegranates, quinces, 'prickly pears,' plums,

foreign trade—Tetuan, Tangier, Laraiche (El Arish), Rabat (and Salli), Casablanca, Mazagan, Saffi, and Mogador. On the rocky N. coast of Er-Rif are the Spanish penal settlements of Peñon de Velez, Alhucemas, Melilla and the Zaffarine Islands; while opposite Gibraltar is Ceuta. The inhabitants, probably from five to eight millions, include:—(1.) Berbers, the backbone of the nation and the original owners. (2.) Arabs, who immigrated between the 7th and 11th centuries, and now occupy the plains. Some parts of the plains, however, as well as the towns, are inhabited by the mixed race generally referred to as Moors.

The religion of these two classes is a strict form of Islam, much purer than that of the Turks or Persians. (3.) Jews, who constitute nearly a fourth of the population of most of the towns. (4.) There is also a considerable sprinkling of negroes and mulattoes. The history of Mo

with the Berbers; scanty classic records of Carthaginian colonies established on the coast; and a period of Roman occupation in the north (Mauretania), dating from the time of Augustus (42 B.C.), to which the Vandals, crossing the strait from Spain, put an end (429 A.D.). Nine native

During the 17th and 18th centuries the pirates of Morocco (Salli rovers) were the dread of W. Europe. There is an army of about thirty thousand men, commanded by an ex-British officer, Kaid Sir Harry M'Lean. In 1905 the Emperor William II. of Germany interfered in the affairs of



rocco practically commences in the 8th century, with the introduction of Islam and the establishment of a branch of Mohammed's family—the Idrists—contemporary with Harun al-Rashid. Previous to this we have but megalithic remains to tell of an aboriginal race incorporated

dynasties have succeeded one another since, the present having risen in the 17th century. The government is an autocracy, subject to religious influences, which severely repress all progress; and the general system is as corrupt as the people who administer and endure it.

the country, his apparent object being to weaken French influence. The tension between France and Germany became acute, but an agreement was arrived at in September 1905, and an International Conference was held at Algeciras in January 1906 to regulate the affairs of Morocco, and to define the rights of the various powers therein. See Budgett Meakin's Land of the Moors (1901), and The Moors, an Account of Manners and Customs (1902); J. Canal's Géographic Générale du Maroc (1902); Joseph Thomson's A Journey to Southern Morocco and the Atlas Mountains (1889); W. B. Harris's Taflet (1895); Hooker and Ball's Morocco and the Great Atlas (1879); Aubin's Le Maroc d'Aujourd'hui (1904); and Pellow's Captivity and Adventures 1715-36 (1890). (2.) The southernmost of the three capitals of sultanate of Morocco; on N. side of the Great Atlas range. some 200 m. s.w. of Fez. Morocco leather and carpets are manufactured. The city was founded in 1072, and in the 14th century was a flourishing place with a population of 700,000. Present pop. 60,000.

Moron de la Frontera, vil., prov. Seville, Spain, 32 m. s.E. of Seville, with remains of a Moorish castle. Olive oil is the principal product. There are principal product. There are marble quarries and iron mines.

Pop. (1900) 14,190.

Moroni, Gianbattista (1525-78), Italian portrait painter, was born near Bergamo. In youth he studied under Moretto, and his early manner shows this influence in reddish flesh tints; and from him he took the silvery tones of his second manner, to which belongs his masterpiece, The Portrait of a Tailor, in the National Gallery, London, where are also good examples of his third or naturalistic manner. He can best be studied in the Carrara Gallery, Bergamo. In foreign collections his pictures have usually been assigned to Titian.

Morpeth, munic. and parl. bor., Northumberland, England, 15 m. N.N.w. of Newcastle. The church of St. Mary dates from the 14th century. Some remains exist of an ancient castle and a 13th-century chantry. Industries include metal-founding, brewing, and brickmaking, and coal is worked. A Cistercian abbey was erected at Newminster (half a mile west of Morpeth) in 1138. Morpeth returns one member to the House of Commons. Pop.
—munic. bor. (1901), 6,158; parl.

bor. (1901), 49,969.

Morpheus, in ancient Greek mythology the son of Sleep; he was the god of dreams,

Morphia, or MORPHINE, C₁₇H₁₇NO(OH)₂, is a monobasic tertiary alkaloid occurring opium, of which it is the active principle. It crystallizes small bitter prisms, and is of undetermined constitution. It forms crystallized salts, that are soluble in water, the hydro-chloride and tartrate being the chief salts used in medicine.

Small doses, taken by the mouth or hypodermically, first excite the mental faculties, then produce sleep, and, according to the dose, annul pain. It is dangerous as a relief from insomnia, as likely to lead to a morphine habit, and in excessive doses causes acute poisoning, sleep being followed by coma and failure of respiration. Emetics, strong coffee, forced walking about, and artificial respiration, are the best treatment in cases of poisoning until medical treatment is available.

Morphology, the study of form in its widest sense, as contrasted with physiology, the study of function. It is applied to the study alike of animal and vegetable form; but it is customary to distinguish the study of the minutize of form as histology, and, similarly, the study of the structure of fossil organisms is separated off as palæontology. The aim of morphology is the investigation of the affinities of organisms, and the discrimination between adaptive characters and those due to inheritance from a common ancestor. ultimate goal is the establishing of a classification which shall accurately represent our knowledge of the origin and relations of living organisms. General works on the science are few; the most famous is Haeckel's (1866). See EMBRYOLOGY, HISTOLOGY, and HomoLogy.

Morphy, Paul Charles (1837-81), American chess-player, was born at New Orleans, and was a chess expert from childhood. He won the first prize at the New York Chess Congress of 1858, and subsequently visiting Europe, defeated the leading players, including Anderssen the champion, Harrwitz, Boden, and Mongredien. He retired from public play in 1859, and finally abandoned the game in 1866.

Morris, or Morrice, DANCE, of Moorish origin, and probably introduced into England by Queen Eleanor of Castile; became a rustic dance, adapted to village feasts and May games. It was suppressed by the Puritans, but a form still lingers in the north of England.

Morris, SIR EDWARD (1859), Canadian statesman, born at St. John's, Newfoundland, of Irish parents; entered Parliament for St. John's (1885), and joined the Whiteway cabinet (1889) and the Bond cabinet (1900). He has twice been delegate to the Colonial Office in London (1897 and 1901), and since 1903 has been attorney-general and minister of justice of Newfoundland. He has edited the Newfoundland Law Reports, 1800-1900.

Morris, GOUVERNEUR (1752-

1816), American statesman, was

born at Morrisania, New York. Having served in the general congress (1777), he became assistantsuperintendent of finances under Robert Morris (1784), and a delegate to the convention which framed the United States con-stitution (1787). He resided in Paris, mainly as Washington's confidential agent (1788-90), and in England and Germany (1791); was United States minister to France (1791-4), senator for New York (1800-3), and chairman of the United States Canals Commission from 1810 until his death. His Dury and Letters was published in 1888. See Jared Sparks's Life and Writ-ings of Gouverneur Morris (1832); Theodore Roosevelt's Gouverneur Morris (American Statesmen Series, 1888).

Morris, SIR LEWIS (1833), British poet, was born at Carmarthen. Becoming a barrister of Lincoln's Inn, he practised as a conveyan-cing counsel (1861-81). He took a rominent place with his Songs of Two Worlds (1872-5) and Epic of Hades (1876-7). The introspective persistency, the deep scriousness, the elevated purity of style, and the literary craftsmanship of these early works mark the poet's successive volumes. Gwen, a Drama in Monologue appeared in 1879; the Ode of Life in 1880; Songs Unsung in 1883; Gycia, a Drama in 1886; Songs of Brit-ain in 1887; A Vision of Saints in 1890; Songs without Notes in 1894; Idylls and Lyrics in 1896; and Harvest Tide in 1901. Sir Lewis Morris's lyrics on national themes-On the Opening of the Imperial Institute, On the Mar-riage of the Duke of York and Princess Victoria Mary of Teck, On the Death of Her Mujesty Queen Victoria—are all strong and memorable by their sincerity, reticence, and felicitous grace of style. His Works appeared in 1891, and a revised edition includes the poems to A Vision of Saints. In 1905 he published The New Rambler: from Desk to Platform.

Morris, RICHARD (1832 - 94), English philologist, was born in Bermondsey, London. He wrote the popular Historical Outlines of English Accidence (1872) and other text-books, besides twelve volumes for the Early English Text Society (1862-80). For the Pali Text Society he edited four texts (1882-8), and was preparing a historical work on Pali and its derivative tongues when he died at Harold Wood, Essex.

Morris, THOMAS (1821), Scottish golfer, called 'Old Tom,' to distinguish him from his son, who died in 1875, was born in St. Andrews. From his earliest years Morris was a keen golfer, and played many famous matches.

In 1849 Robertson and he played a match for £400 with the brothers Dunn, when the former couple were victors. In 1851 Morris left St. Andrews to keep the green at Prestwick-a post he held for fourteen years, till his appointment as green-keeper at St. Andrews. He retired in

Morris, William (1834 - 96), English poet, decorator, and socialist, was born at Waltham-stow, Essex. At Oxford he en-joyed the congenial company of Edward Burne-Jones; and holiday tours in France during 1854 and 1855 gave him a deep en-thusiasm for mediaval architecture and craftsmanship. In 1856 he financed and contributed to the Oxford and Cambridge Magazine. At this time he entered the



William Morris. (From a photo belonging to Emery Walker.)

office of the architect G. E. Street The influence of Rossetti turned his thoughts towards painting, and he set up a studio with Burne-Jones. In 1857 he joined in the fresco work at the Oxford Union, which proved a splendid failure. Meanwhile he had written much imaginative and romantic poetry, which appeared in 1858 as The Defence of Guenevere. His co-operation with the architect operation with the architect Philip Webb in building the Railip Webb in building the Red House, Upton, for his occupation led, in 1861, to the establishment of the firm of Morris, Marshall, Faulkner, and Co. (later Morris and Co.) for all sorts of household decoration, and in 1862 Morris gave up easelmenting for the handicrefts painting for the handicrafts. Among his partners were Rossetti, Burne-Jones, and Madox Brown; but Morris was the moving spirit, and divided his energies between design and the study of dyeing and other technical processes. Shortly after 1871 he took up his residence at the ancient manor house of Kelmscott, near Lechlade, Ox-ford. About the same time he became a socialist, and took a leading part in the affairs of the Democratic Federation and similar bodies. Amongst the chief occupations of his later years were the writing of prose romances in an exquisite if rather artificial English, and an attempt to restore the forgotten typo-graphic arts of the loth century by means of the Kelmscott Press, especially by his great Chaucer volume illustrated by Burne-

Jones (1896)

Bibliography - Poems: Earthly Paradise (1868-70); The Earthly Faratise (1808-10); The Life and Death of Jason (1867); Lore is Enough (1873); The Eneids of Virgil (trans. 1876); Sigurd the Volsung (1877); The Odyssey (trans. 1887); Poems by the Way (1891); The Story of Grettir the Strong (trans. with E. Magnússon, 1869). Prose: Völsunga-Saga (trans. with E. Magsunga-Saiga (trans. with E. Mag-nússon, 1870); Three Northern Lore Stories (trans. 1875); The Aims of Art (1887); Signs of Change (1888); A Dream of John Ball (1888); The House of the Wolfings (1889); The Roots of the Mountains (1890); The Story of the Clitterius Plain (1890) of the Glittering Plain (1890); News from Nowhere (1891); The Wood beyond the World (1894); Child Christopher (1895); Well at the World's End (1896); Old French Romances (trans. 1896); The Water of the Wondrous Isles (1897); The Story of the Sundering Flood (1898).

of the Sundering Flood (1898). Drama: The Tables Turned, or Nupkins Awakened (1887). See Biographies, by J. W. Mackail (1899) and Vallance (1897); Bibliography, by T. Scott (1897).

Morris, WILLIAM O'CONNOR (1824-1904), British judge and author, was born in King's Co., Ireland. He was called to the Irish bar (1854), and became professor of law. King's Inns. Dublin. fessor of law, King's Inns, Dublin. He was for several years special commissioner of Irish fisheries, and was an Irish county court judge from 1872. His chief works are: Great Commanders of Modern Times (1891); Napoleon (Heroes Series, 1893); Moltke (1893); Hannibal (Heroes Series, 1897); Memories and Thoughts of a Life (1895); Ireland, 1798-1898 (1898); (1899); Ireana, 1795-1898 (1899); The Campaign of 1815 (1990); Present Irish Questions (1901); Memoirs of Captain Gerald O'Connor (1903); Wellington, Soldier and Statesman (1904). He has written on many Irish subjects for this Encyclopædia.

Morrison, ARTHUR (1863), English novelist, was born in Kent. His London East End studies. (1894), Tales of Mean Streets, was widely successful, and has been followed by Martin Hewitt, Investigator (1894); Chronicles of Martin Hewitt (1895); Adventures of Martin Hewitt (1896); A Child of the Jago (1896); The Dorrington Deed Box (1897); To London ton Deed Box (1991); To London Town (1899); Cunning Murrell (1900); The Hole in the Wall (1902); The Red Triangle (1903); The Green Eye of Goona (1904); Divers Vanities (1905); and a play, That Brute Simmons (with H. C. Sargent, 1904). Morrison, GEORGE ERNEST

Morrison, GEORGE ERNEST (1862), correspondent of the Times at Peking, was born at Geelong, Victoria. As a young man of twenty he shipped as an ordinary seaman, in order to observe the conditions under which the Kanakas were transported to Australia. His articles on the subject in the Melbourne Argus resulted in more humane conditions being prescribed for the traffic. Morrison then tramped across Australia from Normanton to Melbourne, and took charge of a pioneer expedition to New Guinea, Morrison being left (1883) for dead in the bush, with a spear-head in his back. He recovered, however, and his roving spirit took him successively to America, the West Indies, Spain, where he was assistant medical officerat the RioTinto copper mines, and Morocco, where he was court physician for some time. About 1892 he set out for the Far East, and travelled in China, Japan, and the Philippines, and in 1894 walked from Shanghai to the Burmese frontier. An Australian in China (1895) was the result of this trip. As spe-cial correspondent of the Times, he 'wandered' from Bangkok in Siam to Yun-nan city in China and round Tong-king, and in February 1897 became *Times* correspondent at Peking. Dr. Morrison shared the dangers of the siege of the foreign legations by the Boxers in July 1900, and was re-

ported to have been murdered. Morrison, ROBERT (1782-1834), English missionary in China, was born at Morpeth, Northumber-land. He left for Canton (1807), where in 1809 he became translator to the East India Company. In 1818 he established the Anglo-Chinese College at Malacca. His great work was his Dictionary of the Chinese Language (1815-23). He also wrote a Chinese grammar and a Chinese translation of the Bible. See his Memoirs (1839) and Townsend's Robert Morrison

(1888).

Morristown, tn., New Jersey, U.S.A., co. seat of Morris co., 28 m. w. of New York, in a fine fruit country. Pop. (1900) 11,267.

Morse. See Walkus.

Morse, SAMUEL FINLEY BREESE (1791-1872), inventor of the electro-magnetic telegraph, was born in Charlestown, Massachusetts. He studied art in London, and after his return to the United States was made (1826) president of the National School of Design, and in 1835 professor of design in the University of New York city. His attention was given not only to art but to chemistry, and espe-cially to electric and galvanic experiments. In 1832 he conceived the idea of that system of electric telegraphy with which his name is identified, and in 1844 the first message was sent between Washington (D.C.) and Baltimore. He wrote Life of Lucretia Maria Davidson (1829), and History of Telegraphy (1869). See Lives, by S. J. Prime (1875) and by Trowbridge (1901).

Morshansk, tn., Tambov gov., Central Russia, 58 m. N.N.E. of Tambov city. It manufactures tallow, soap, glue, malt, hydro-mel, and spirits of wine, and has breweries, sawmills, and fisheries. There is a fine cathedral. Pop. (1897) 27,756.

Mortality. See VITAL STA-TISTICS.

Mortar, a mixture used in building to fill the spaces between bricks or stones, consists of about one part by bulk of slaked lime with three of sand (or less commonly screened ashes), along with sufficient water to make a paste. Soon after being laid it sets, or becomes stiff, by separation and loss of water, and then hardens by the conversion of slaked lime into calcium carbonate by absorption of carbon dioxide from the air.

Mortara, tn., Pavia, Italy, with iron works, and machinery and hat factories. The Austrians defeated the Sardinians here in 1849. Pop. (1901) 8,697.

Mortara, EDGAR, CASE OF. On June 24, 1858, Anna Morisi, a fanatical Roman Catholic maid-servant, baptized Edgar, the infant son of a Jewish family named Mortara, at Bologna, and fled with him to Rome. Although not guilty of the abduction, there be little doubt that the Catholic church authorities subsequently shielded Morisi. The parents demanded vainly the return of their son, and a storm of indignation swept over Europe. In England an influential pro-test was signed (October 1859), and France and Prussia appealed to the Pope, who refused to interfere. During the occupation of Rome (1870), Mortara was discovered, but refused to abjure the Roman Catholic faith. He became an Augustinian monk, and preacher of repute. See L. Vollet's Edgar Mortara (1881).

Mortar and Pestle, an appliance for grinding, or less com-monly for mixing, materials. The mortar itself is a bowl of varying shape, most commonly made of iron, porcelain, wedgwood ware, glass, or agate, in which the pestle, of more or less club shape, is worked by hand. Iron mortars are suitable for pulverizing hard and coarse materials, wedgwood mortars for pharmaceutical preparations, glass or porcelain for analytical work, and agate for the fine grinding of very hard substances. Mortars of hardened steel are also employed for the latter purpose, but the substance is then put in a flat-bottomed steel cylinder and crushed by hammering a nicely-fitting steel plunger down upon it.

Mortgage, a conveyance of land or other property by the mortgager to the mortgagee as a security for the payment of money. The mortgagor covenants to repay with interest on a certain day, generally six months hence, and conveys the land to the mortgagee with a proviso enabling him to redeem it on payment. But even if he does not pay on the day mentioned, equity allows him to redeem nevertheless, and this right is called the equity of redemption. The mortgagor very often mortgages this right to redeem. and creates a second or equitable mortgage; and however many mortgages there may be, a mortgagor has an equity of redemp-tion at the end of them. The remedies of the mortgagee are as follows:—He can (i) sue the mortgagor personally for the money; (2) foreclose—i.c. apply to the court, claiming that the mortgage should be paid within mortgage should be paid within a certain time, or that the mortgagor should lose, or be foreclosed from, his equity of redemption; (3) appoint a receiver to collect the profits and pay his interest; (4) enter into possession himself; (5) sell on default in payment, repay himself and the other mortgagees, and pay the balance to the mortgagor. The balance to the mortgagor. mortgagor may pay off the debt, interest, and costs after giving notice, or he may transfer the debt to another mortgagee, who pays off the original mortgagee. If there are three mortgagees (A, B, and C) to an estate, C can get paid before B, provided he originally had no notice of B's mortgage, by buying up A's mortgage. A mortgage debt is personal estate; and a devisee of mortgaged land prima facic, under Locke King's Act, 1854, has to pay off the mortgage. An equitable mortgage is often created by depositing title deeds with the mortgagee. See Coote on Mortgages (7th ed. 1904).

Mortification, in Scots law, a gift of lands for ecclesiastical or charitable purposes, the Mortmain Acts not applying to Scotland. The lands given to the church in Scotland before the reformation were transferred to the crown by an act of the Scottish Parliament of 1587.

Mortification of Tissues.

See Gangrene.

Mortimer, Roger, First Earl of March (? 1287-1330). The misgovernment of the country under Edward II. gave his wife Isabella the excuse for allying herself with Mortimer, and together they invaded England from the Low Countries in 1326. They captured and put to death Despenser, the king's favourite; and the king himself fell into their hands, and was ultimately murdered. During the minority of Edward III. Mortimer and his royal paramour Isabella ruled the country, although there was nominally a council of regency; but in 1330 the young king asserted himself, and had Mortimer put to death.

Mortlake, vil., Surrey, England, on Thames, 2 m. N.E. of Richmond. The church, founded in the 14th century, contains the tombs of Phillips, co-actor with Shakespeare, and Sir Philip Francis, the reputed author of the Letters of Junius. Tapestry works were established here in the time of James I., and later the place was noted for pottery. Malting and brewing are carried on. Mortlake is the terminus of the Oxford and Cambridge boat-race course.

Pop. (1901) 7,774.

Mortmain. Alienation in mortmain is an alienation of lands to any corporation, sole or aggregate, ecclesiastical or temporal. Through such alienations the services which under the feudal system were due out of the lands aliened were unduly withdrawn, and the chief lords also lost their escheats, wardships, relief, and the like, for a dead hand (mortua manus) yieldeth no service.' So common were these alienations in mortmain by persons who thought they thereby 'purchased heaven,' that more than half the land of the kingdom is said to have become vested in religious houses, and once vested it could not be alienated. Here was the 'dead hand' again. It was to check such accumulations, and the 'locking up of land' (as Lord Hardwick calls it) consequent thereon, that the first Mortmain Statutes were passed (9 Hen. 111. c. 36; 7 Ed. I. c. 13; 13 Ed. I. c. 32; 15 Rich. II. c. 5; and 23 Hen. VIII. c. 10). These acts made alienation to corporations without licence in mortmain from the crown, and a licence from the lord also (afterwards dispensed with), a cause of forfeiture: but they still left it

open to a man to dispose by will of land for charitable as distinguished from 'superstitious' uses. To check the abuse of these gifts by 'languishing or dying persons to the disherison of their lawful heirs,' the legislature again interheirs,' the legislature again inter-posed, and, by the Mortmain Act, 9 Geo. 11. c. 36, declared all gifts by will for charitable purposes void unless made by deed executed in the presence of two witnesses twelve calendar months before the death of the donor and enrolled in Chancery. Under the Mortmain Act, 1888, no assurance of land may be made to a corporation without licence from the King. All assurances of land to charities must (1) take effect in possession immediately; (2) be without any reservation in favour of the assurer; (3) must be by deed attested by two witnesses; (4) must, unless for valuable consideration, be made at least twelve months before the death of the assurer; (5) must be enrolled in Chancery within six months of the date of the assurance. There are many exemptions in favour of schools, universities, museums, parks and open spaces, and the like; and now, by the Mortmain Act, 1891, land may be assured by will to a charity, provided it is sold within a year from the death of the testator, unless it is

required for actual occupation.

Morton, James Douglas, FOURTH EARL OF (d. 1581), regent of Scotland, was the younger son of Sir George Douglas of Pittendriech. He did not definitely join the Lords of the Congregation till 1560. On the arrival of Mary Stuart in Scotland he was mary stuart in Scotland ne was made a member of the Privy Council, and in 1563 was ap-pointed lord high chancellor. He supported the marriage of his kinsman Darnley to the queen, and headed the armed band who murdered Rizzio in Holyrood Palace; but he de-clined to take part in the con-spiracy against Darnley's life. When Bothwell carried off the queen, Morton headed the movement for her deliverance, and he had a prominent share in the procedure which led to her imprisonment in Lochleven Castle. During Moray's regency he was his chief confidant and supporter; and in 1572 he was chosen regent. Under his régime the last blow was given to the cause of the queen by the surrender of Edinburgh Castle, and his able if in some respects unscrupulous administration inaugurated a short period of unexampled peace and order. But by his determination to curb the pretensions of the kirk, and his appropriation for secular purposes of the old church revenues, he lost the support of the clergy; and by his

exertions to recover the lands alienated from the crown he awakened the hostility of the nobles. At a convention held at Stirling (1578) the king was therefore induced to take the government into his own hands. In 1580 Morton was accused of the murder of Darnley, and executed in the Grassmarket, Edinburgh.

Morton, John, Cardinal (?1420-1500), Archbishop of Canterbury, was born near Bere, Dorset. He was attainted and banished as a Lancastrian (1461); but on submitting to Edward IV. he became Master of the Rolls (1473) and bishop of Ely (1479). Henry VII. made him primate and chancellor (1486); he was created cardinal (1493).

Morton, John Maddison (1811-91), English dramatist, was born at Pangbourne, Berkshire. He abandoned a Chelsea Hospital clerkship for play-writing (1840), and produced almost a hundred successful pieces, mainly farces, adapted from the French. The most famous is Box and Cox, first played at the Lyceum Theatre (1847). See Memoir by Clement Scott, prefixed to Plays (1889).

Morton, Levi Parsons (1824), American banker and politician, was born at Shoreham, Vermont, of Pilgrim stock; rose from a country 'store,' and founded banking-houses in New York (1863) and London. Entering Congress as a Republican from New York (1878), he was United States minister to France (1881-5), vice-president of the United States under Harrison (1888-92), and governor of New York (1894-8). See Lives of Harrison and Morton (1888).

Morton, OLIVER PERRY (1823-77), American statesman, was born at Salisbury, Indiana. A lawyer and vigorous debater, he was elected Republican governor of Indiana (1861), and raised large bodies of troops for the Federal army, earning the nickname of the 'war governor.' Re-elected governor (1864), he sat as United States senator from 1877 until his death. See Life of O. P. Morton by Foulke (1899).

Morton, SAMUELGEORGE (1799-1851), American physician and craniologist, was born in Philadelphia of Quaker family; became professor of anatomy at Philadelphia Medical College. His oraniological researches led him to collect over 1,500 skulls, 900 being human. In his Crania Americana (1839) he maintained that the North American aborigines differ from all other races, even the Mongol. His Crania Egyptiaca (1844) asserts the Caucasian origin of the early Egyptians. Morton was president of the Philadelphia Academy of

Sciences (1850). See *Memoirs*, by S. F. Milligan (1891).

Morton, THOMAS (? 1764-1838),

Morton, Thomas (? 1764-1838), English dramatist, was born at Whickham, Durham. From 1792 he produced numerous successful plays, perhaps the best known being Speed the Plough (1798), which gave us the proverbial 'Mrs. Grundy.' His most popular pieces were Zorinski (1795), The Way to get Married (1796), and Town and Country (1807).

and Town and Country (1807).

Mortuary. Under the Public Health Act, 1875, the Public Health (Ireland) Act, 1878, and the Public Health (Scotland) Act, 1897, a local authority may, and in England and Ireland if required by the Local Government Board must, provide mortuaries for the reception of dead bodies before interment, and may provide places for post-mortem aminations. Under the Public Health (London) Act, 1891, the sanitary authorities (i.e. the metropolitan borough councils and the corporation of the City) must provide mortuaries. (See BURIAL. and for the Morgue at Paris see MORGUE.) In ecclesiastical law a mortuary is an offering to the church on death, and it appears that formerly a person could not leave his property by will unless he left a sufficient mortuary. Mortuaries are apparently not extinct, and are governed by a statute of 1530.

Morvi, feudatory state, Kathiawar, Bombay, India, with an area of 821 sq. m., and a population (1901) of 106,000. Morvi, the chief town, is 120 m. s.w. of Ahmadabad. Pop. (1901) 17,820.

Mosaic, a surface decoration consisting of variously coloured pieces of glass, marble, ceramic, or other similar materials set together to form a pattern or device, and bedded in a mastic or cement ground. Mosaic work is one of the earliest forms of decorative art, and though its origin is uncertain, it is believed to have been first used by the Egyptians, and subsequently adopted for floor and mural decoration by the Greeks and the Romans. It was extensively used by the Byzantine artists, who reintroduced it into Italy, where it continued to be practised until late in the middle ages. The art was revived about 1840, but it is only during the last forty years that its use as a means of adding colour to an architectural scheme

has been appreciated.

Originally the whole of a work was carried out in situ, the mosaicist cutting his tessers and bedding them as the work proceeded; but at the present time nearly all ornamental or figure work is carried out as two distinctly separate operations. The ornamentation or figure subject having

been drawn out on suitable paper, the tesseræ are cut to the requisite shapes and attached to the design with gum or other mucilage. space to receive the mosaic is then rendered up in cement or other mastic, and into this the mosaic is bedded. When the mosaic is made of marble, the surface is rubbed with grit stone to give

a finished face.

For walls (though marble and ceramic is used) the most permanent and sumptuous form of mural decoration is glass mosaic. The glass enamels (smalti) are made of the same materials as other glass, with the addition of other mineral substances which when fused together give the paste its density, hardness, and also its colour. These enamels are made in cakes and sticks, which are cut into tesseræ, and, in workmanship, the tesseræ are laid with one of their cut edges outwards. Metal enamels are also greatly used. These are made by placing a leaf of gold, silver, or other metal on a glass base, running over it a film of glass, and fusing the whole together in a furnace.

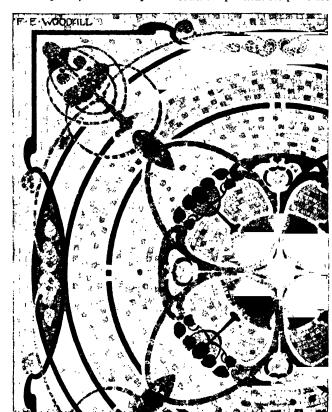
Design or figure subjects are invariably worked in the coloured enamels, the background being either coloured enamel or one of the metals which are also cut into tesseræ. The Albert Memorial is a well-known example of this style of work. For pavements the materials chiefly in use are marble, ceramic, and an opaque glass, the tesseræ being from three eighths of an inch upwards. Those for marble mosaic are prepared from sawn slabs, those for ceramic are cast, and those for the glass mosaic are cut from cakes. A relatively modern pavement now greatly used, but which is practically similar to the opus incertum of the Romans, is known as Terrazzo mosaic. This is made up of irregular shaped pieces of marble mixed with Portland cement. trowelled on to a prepared concrete bed, and when set rubbed to a smooth face with grit stone. For sharpness of line colouring matter is mixed with the cement. Ornamentation is added to a floor by the aid of wood patterns, which are cut to the required design. These patterns are placed in position on the concrete and the ground worked round them, and when this is sufficiently set the patterns are lifted and the void filled in with variously coloured pieces of marble mixed with cement. See Caul Elis's Handcement. See Caul Lins & Hamb-buch der Mosaik (1881); E. Gers-pach's La Mosaique; A. Salviati's On Mosaic (1862); and Wyatt's Mosaic of the Middle Ages (1848).

Mosaic Gold, stannic sulphide, SnS2, is obtained by heating tin

with sulphur and ammonium chloride; a finer product is said to be obtained by adding mercury as well. It forms golden scales, and is employed for imitation gilding and bronzing.

Mosasaurus, a genus of large extinct reptiles, which had long, attenuated bodies, powerful jaws, and limbs adapted for swimming. They belong to the Upper Cretaceous period, and fine speci-

throughout Europe, but settled in London (1826), where he was one of the directors, and for some time a conductor, at the Philhar-monic concerts. Leaving London (1843), he became professor of the piano at the Conservatorium, Leipzig, then recently founded by his friend and erstwhile pupil, Felix Mendelssohn. Moscheles was a sound musician, and many of his compositions for piano are



Mosaic Design by F. E. Woodall.

mens have been found in Maestricht in Holland, and in west-ern N. America.

Mosaylima, or Moseilema, a contemporary and rival of Mohammed. He claimed to share, equally with the founder of Islam, the title of 'Messenger of God,' and declared that before Mohammed's death the latter had acquiesced in his succession. In seeking to justify his claim he was slain by Khalid, general of the caliph Abu-Bekr (643).

Moscheles, IGNAZ (1794-1870), Bohemian pianist and composer, was born at Prague. From 1815 he made frequent concert tours still highly esteemed. See Life by his wife (Eng. trans. 1873).

Moschus, a Greek bucolic poet, who lived towards the middle of the 2nd century B.C., was a native of Syracuse, and calls himself a pupil of Bion. Four of his idylls are extant. He writes with elegance and spirit, but his style is over-elaborated and affected. B over-classorated and affected. Editions—text, Ahrens (1875); Hermann (1849); with notes, Hartung (1858); English translation (1889) by Andrew Lang (including Theocritus and Bion),

Moscow (Russ. Moskva). (1.) Government, Central Russia. covering an area of 12,859 sq. m.

It is a gently-rolling country, traversed by three main ridges, separating the valleys of the Volga proper, the Oka, the Moskva, and the Klyazma. The government is the centre of the Muscovite coal field, and its limestone quarries are famous. Forests occupy some forty per cent. of the area. Orchards and mulberry plantations flourish. Industrially and commercially Moscow ranks first among Russian governments. The manufacture of cotton is of chief importance; next come woollen and silk textiles, spirits, beer, flour, leather, metals, chemicals, paper, jewellery, perfumery, furniture, and carriages. Pop. (1897) 2,433,356. (2.) Ancient and still, in a sense, joint capital of Russia, the second largest city of the empire, cap. of above gov., on the Moskva, a tributary of the Oka, 380 m. s.s.e. of St. Petersburg. It is the see of the metropolitan (formerly patriarch) of Moscow, the chief prelate of the Russo-Greek Orthodox Church. Moscow consists of six parts, of which the first two, and especially the first, form a natural and historical centre, and the rest an ever-widening series of circles. The Kreml or Kremlin, Moscow's acropolis, is entirely surrounded by a wall (40 ft. high), enclosing a space of more than 80 acres. Inside is the cathedral of the Assumption, built in 1474-9, in Lombardo - Byzantine style, in which the Russian emperors are crowned. The cathedral of the Annunciation, founded at the beginning of the 14th century, contains 15th-century paintings by Rublov. The cathedral of St. Michael contains life-sized frescoes of early Russian sovereigns round the walls. The isolated bell tower of Ivan Velikii has a head of gilded copper, some 260 ft. above the pavement. One of the bells weighs almost 64 tons. The Czar Kolokol, or King of Bells, stands on a pedestal at the foot. The old imperial palace, the former residence of the Czars, was built in 1487. The Great Palace, an immense pile built in 1806 by Alexander I., contains a collection of ancient robes and armour. The Little Palace, built by Nicholas I., contains valuable pictures and a great collection of books relating to Moscow. Among other wonders of the Kremlin are the Treasury of the Patriarchs, the Chudov Convent, the House of the Holy Synod, and the Saviour Gate. Facing the Kremlin across the square are the new 'Bazaar' and a series of splendid areades. At the E. extremity is the cathedral of St. Basil (built in 1554), one of the strangest erections of Chris-tian art. This division, Kitai Gorod, is surrounded by walls

built in 1534, and enclosing a space of over 100 acres. The inhabitants are largely wealthy men of business. The White City encloses the Kremlin and Kitai Gorod in a great semicircle, and in it are the university; the Rumyantsov Museum, containing one of the best li-braries in Russia; the 'Great' and 'Little' theatres; and the Saviour Church, the largest and most imposing sacred edifice in Moscow. The 'Town of Earth' forms the outer ring, over 2½ m. in diameter. Most of the railway stations are in this section; so also are the picture gallery, houses of old-fashioned nobility and types of the Muscovite merchant residence of ancient pattern, and the Triumphal Arch of Alexander I. The celebrated Troitsa monastery lies some distance out There are several on the N. parks, gardens, and pleasure resorts in or near Moscow. The city has woollen, silk, and metal manufactures, cotton mills, tanneries, and candle factories. At first (from 1147) an appanage of Vladimir, Moscow was burned by the Mongols in 1237. Its greatness began with Ivan I., when the metropolitan of Vladimir transferred (1325) his seat to Ivan's city. In 1382 it was sacked by city. In 1382 it was sacked by the Mongol Tohktamish; but in 1480, under Ivan III., 'the Great,' it was able to defy its nomadic overlords. From 1480 it became definitively the capital of the Russian race, supreme over Novgorod (first from 1471, finally from 1570), over Kazan (1552), over Astrakhan (1554), over Kiev (1667). From 1339 its rulers claimed the title of Grand Princes of Russia; from 1547 they took the style of Czars. For eighteen months at the beginning of the 17th century it was occupied by the Poles. In 1703-4 Peter the Great founded St. Petersburg, and moved the capital thither in 1711. In 1812 Moscow was occupied by Napoleon's grand army, and was burned by its own people. During the disturbances of 1905-6 Moscow was the scene of many sanguinary revolutionary out-breaks and strikes. Pop. (1897) 1,092,360.

Moselle, or Mosel, a natural, unfortified wine, mild, not too acid, easily digested, light, deli-cate, and of agreeable flavour. The sparkling Moselle of Koblenz is famed for its peculiar bou-quet and muscatel flavour. This flavour is, however, not infre-quently derived from an alcoholic extract of elder flowers, instead of from the muscat grape. There are both 'still' and 'sparkling' forms. The alcoholic content varies between 7 and 10 per cent., with an average of 9.5 per cent. The vintages agree closely with

those of the hocks. The Asti region of California produces wines of the Moselle type, which are light and dry.

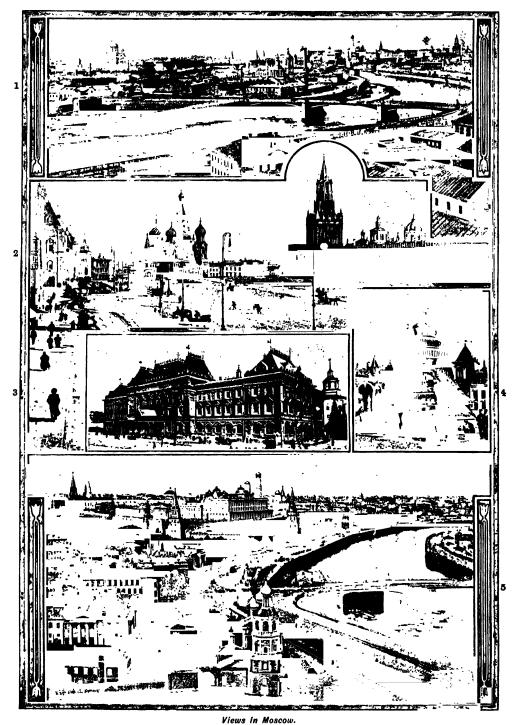
Moselle, or Mosel, trib. of Rhine, rising on W. slopes of Vosges Mts., flows N. through Meurthe-et-Moselle to French boundary. Proceeding N. past Metz and Thionville, it traverses the Prussian Rhine Province, and joins the Rhine at Koblenz (Con-Through most of its duentes). course it is confined to a narrow, fertile valley; its slopes, espe-cially in the lower course, are terraced with vineyards, which produce the famous Moselle produce the famous Moselle wines. There are numerous historic ruins on its banks. The chief tributary in France is the Meurthe, and in Germany the Saar. Total length, 314 m., 214 being navigable for small vessels.

Mosely Commission, an industrial commission to the United States, originated (1902) by Mr. Alfred Mosely. It consisted of twenty-three delegates, who visited America, and were engaged from October to December 1902 in an inquiry into the labour conditions prevailing in the United States. In 1903 a similar commission, also projected by Mr. Mosely, visited America to in-quire into the educational system of the United States and its bearing on national commerce and industry; while a second educational commission visited America

in 1906.

Moser, MARY (?1774-1819), floral painter, daughter of a Swiss enameller, George Michael Moser (afterwards first keeper of the Royal Academy), was celebrated for her floral paintings, and much patronized by Queen Caroline. Chosen a member of the Academy, she contributed floral and other paintings to the exhibitions until 1802. She was a friend of Fuseri,

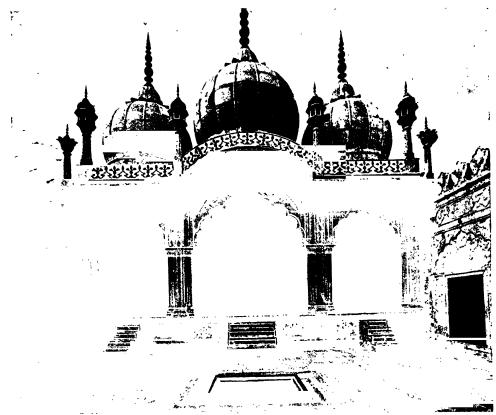
and died in Chelsea. Moses, the brother of Aaron and Miriam, and the founder and legislator of the Israelite nation. The story of his birth and infancy is one of the treasured gems of Hebrew literature. He was of the tribe of Levi, and his mother, Jochebed (his father's name was Amram), hid him three months in defiance of the edict of Pharaoh, who, to prevent the growth of his Hebrew slave population, had ordered all their male children to be put to death at birth. As the danger of discovery became great, the infant was placed in an ark on the Nile, was found and adopted by the daughter of Pharaoh, and was brought up as an Egyptian prince. But his heart was with his enslaved brethren, and his slaying of one of their oppressors necessitated his flight to Midian, where he received a divine call to be the deliverer of



1. General view, looking north. 2. Red Square: Cathedral of St. Basil and Bazaar. 3. Hôtel de Ville. 4. The Great Bell. 5. The Kremlin.

his people from Egypt. After considerable trouble he led them forth, crossed the Red Sea, in which the pursuing Egyptians were drowned, and then, during a forty years' march in the desert organized the religious and social polity of the nation, eventually dying on Mt. Nebo, close to the promised land. Such is the bare outline of the life of Moses as given in the Pentateuch, of which he was long believed to be

regarded as facts which criticism cannot gainsay. Even if we cannot regard him as the writer of the Pentateuch, and if much of his life be the idealization of a later age, he still remains as ever a unique and sublime figure, with-out whom neither Judaism, Mohammedanism, nor Christianity could have been what they are, and worthy to be called the pro-totype of the Redeemer. See, for traditional life, Rawlinson's and the chancellorship of Göttingen. Mosheim's great work is the Institutiones Historiæ Ecclesiastica (1755), translated by Dr. Murdock (1832; new ed. 1892). His attitude is one of liberal orthodoxy, and his mod-eration has led to charges of indifference. He also published De Rebus Christianorum ante Constantinum (1753), Heilige Reden (sermons; 4th ed. 1765), and over a hundred other works. His style



The Pearl Mosque (Moti Masjid), Delhi.

the author; but as recent research has shown that the so-called books of Moses are analyzable into different documents, composed at different times, and not put in their present form till centuries after Moses, many doubts have been raised as regards both his personality and the special service he performed for Israel. But his deliverance of them from Egypt, his promulgation of moral and social laws, his proclamation of Jahveh as the rightcous God of Israel, and his conquest of the land east of the Jordan, may be

Moscs, his Life and Times, in Men of the Bible Series (1887); for personality and work, W. R. Smith's Old Testament in Jewish Church, 254 ff. (1881); Schultz's Old Testament Theology, i. 125 ff.; and Oosterzee's Moses (Eng. trans.

Mosheim, Johann Lorenz von (1694–1755), German ecclesiastical historian, was born at Lübeck; became professor of philosophy at Kiel; and held the theological chair at Helmstadt, Brunswick, from 1725 to 1747, when George II. gave him the chair of divinity is formal, but as a preacher he

was ardent and eloquent.

Mosman, suburb, 2½ m. from
Sydney, N.S.W., Australia, on
N. shore of the harbour, co. Cum-

berland. Pop. (1901) 5,696.

Mosque, or MASJID, a Mohammedan house of worship. The design is generally uniform. A large paved square on a raised plinth is surrounded by high and massive walls. The centre is unroofed, and open colon-nades run along the four sides. Sometimes there is but one entrance, but more often there are

four, each marked by a high archway. The characteristic features of these buildings are the dome, or domes, of Saracenic design, and the minarets. In the centre of the open quadrangle is a tank of water for ablutions, and in the interior there are a pulpit and a reading-desk, but no seats. The worshippers enter barefooted. Some jami masjids (cathedrals) cover immense areas, while smaller temples, such as the Moti Masjid, or Pearl Mosque, at Delhi, are beautiful examples of Moham medan architecture. In many cases rich endowments maintain not only the priests and the mosque, but also the schools, hospitals, and almshouses connected with the building.

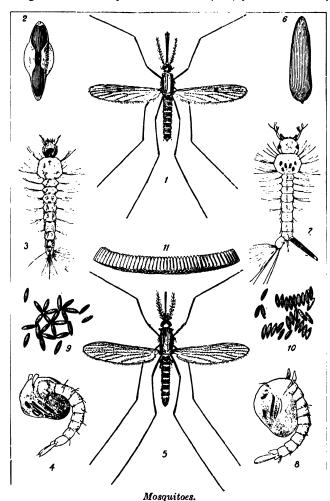
Mosquitoes, or GNATS, are flies belonging to the family Culicidæ, and have lately become enormously important on account of their undoubted connection with the transmission of malaria, and the probability that they are connected with the propagation of other tropical diseases. No real distinction can be said to exist between mosquitoes and gnats. The difference in regard to the virulence of the bite, upon which the popular distinction rests, apparently varies with a variety of conditions, partly, no doubt, with the species of mosquito, but probably chiefly with its condition i.e. according as it does or does not contain protozoon parasites. (See MALARIA.) The adult mosquito may be recognized by the fact that the antennæ have plumes or whorls of hair, often long and dense in the male, while the head bears a long projecting proboscis. As in the allied midges, the blood-sucking habit is con-Blood is fined to the female. apparently not the sole or even the chief food, and there seems no doubt that millions of indi-viduals live and die without ever tasting it. The larvæ are always aquatic, and it is shallow standing water which seems specially to suit their habits. The com-mon gnat of England is Culex pipiens, the same species which in warmer countries constitutes the much-dreaded 'mosquito.' It does not appear that this species ever carries malarial infection, the mosquitoes of malaria, so far as is yet known, being always species of Anopheles. See Miall's Natural Hist. of Aquatic Insects (1895).

Mosquitos, natives of the Mosquito coast on east (Atlantic) side of Nicaragua, and south-east corner of Honduras in Central America. They are a very mixed people, the chief constituent elements being the local Indian, the Carib Indian from the W. Indies, and the Negro, mainly from Jand the Negro, mainly from

maica, with a strain of white blood dating from the days of the buccaneers. All speak colonial English. It was the footing claimed by England in Central America through the Mosquito protectorate that aroused the jealousy of the United States and brought about the Clayton-Bui-

relsome, and, although nominal Christians (converted by the Moravian missionaries), of extremely lax morals. See Courtenay de Kalb's Nicaragua Studies on the Mosquito Shore (1893); C. Napier Bell's Tangweera (1899); A. S. Gatschet in Globus (Feb. 1900).

Moss, tn., prov. Smaalenene,



1. Anopheles, imago; 2, egg; 3, larva; 4, pupa. 5. Culex, imago; 6, egg; 7, larva; 8, pupa. 5. Egg mass of Anopheles bifurcata. 10. Egg mass of Anopheles maculipenuts. 11. Egg boat of Culex pipiens.

wer treaty of 1850. So recently as 1903 the Mosquitos have again appealed to England for protection against the misrule of the Nicaraguan government. The Negroid Carib section are an indolent, debased people; but the Tangwiras, ormore marked Indian type, are described as bold seafarers, frank, friendly, but quarters.

S. Norway, on E. side of Christiania Fjord, 12 m. N.E. of Tönsberg. It exports timber; total annual value of trade, £400,000. On Aug. 14, 1814, the convention between Norway and Sweden, which united the two states under one king, was signed here, a union that was dissolved in 1905. Pop. (1900) 8,941.

Mossamedes, tn., Angola, Portuguese W. Africa, on Mossamedes (Little Fish) Bay. Good cotton, sugar, and coffee are grown, and fish are cured for exportation. Annual value of trade, about £150,000. There are deposits of guano and ni trate of soda. Pop. about 5,000.

ophyta, which includes the liverworts (Hepaticæ), as well as the true mosses (Musci), but more generally is confined to the latter. These, though possessing a stem, with leaves and rhizoids or rootlets, from which new plants grow, have no true vessels. In the stem of some genera is a

W. F. S. C. 5a 5 9 14 12 Mosses.

Bryins: 1. Plant, Funaria hygrometrica. 2. Sporange, longitudinal section. 3. Plant, Hypnum populeum. 4. Plant, Polytrichum commune. 5, 5a, 5b, Sporanges. 6. Young plant, Barbula. 7. Longitudinal section of female inflorescence of Funaria hygrometrica. 8. Peristome of Atrichum undulatum. Phasacces: 8. Plant, Phauridum subulatum. Andesacces: 10. Plant, Andresa alpestris. 11. Dehiscent sporange and spophyse. Sphagnaces: 12. Plant, Sphagnum acutifolium. 13. Section, female inflorescence of Sphagnum acutifolium. 14. Longitudinal section of sporagone.

Mossel Bay, seapt. (free port), Cape Colony, formerly Aliwal South. The harbour has from 3½ to 7 fathoms of water. Pop. (1904) 10,698.

Mosses, a term often used with the same meaning as Bry-

central strand, which seems to foreshadow the vascular bundles of the higher cryptogams. The leaves usually consist of a single layer of cells containing chlorophyll bodies, and are arranged spirally on the stem. There is also an arrangement, more or less complicated, for the absorp-tion and storage of water. To this mosses owe their spongelike quality. In dry weather the spreading beds of moss, give out the water they have sucked up during heavy rains, thus acting as natural sources of irrigation. The male and female organs (antheridia and archegonia) are similar to those of the Pteridophyta (ferns, horse-tails, and club-mosses), whence some writers have classed these with the Bryophyta in a separate division (the Archegoniata). These organs occur in groups, either at the top of the main stem or springing from some of the branches. Each group is called a receptacle, and, with the involucral leaves (perimin the involucial leaves (perichatia), is popularly known as a 'moss flower; but there is only a simulation of the appearance of true flowers. The male organs are club-shaped, and the female organs resemble miniature flasks or bottles: both may be borne on a single plant, which is then said to be monœcious; diœcious plants bear organs of one sex only. From the union of the male and female cells the asexual generation arises. When the flask splits, the embryo settles on the plant, giving off at its base rhizoids, by which it is attached and nourished, and develops into a sporogonium, consisting of a column (seta) surmounted by a capsule, in which the spores are formed. The capsule bears an operculum or lid covered by a hood, and both fall before the ripening of the spores. From the spore falling on moist ground there arises a threadlike growth, the protonema, whence new moss plants are developed, thus completing the cycle of the sexual and asexual generations. Four orders of mosses (Musci) are usually reckoned:—(1.) Bryinæ (the Stegocarpæ of some systematists). Here belong most of the true mosses, and the development of the fruit is that described above. It has two main divisions-Acrocarpæ, in which the female organs and spore-cases are terminal on the main axis; and Pleurocarpæ, in which they are borne on lateral branches. To the first belong branches. To the first belong Mnium, Polytrichum, and Fu-naria; Hypnum and Fontinalis are examples of the latter. (2.) Phascaceæ, with terminal capsule, by the decay of which the spores are set free. (3.) Andreaceæ, in which the capsule opens longitudinally, the valves remaining united at the apex and base. (4.) Sphagnaceæ, with a base. (4.) Sphagnaces, with a spherical capsule containing a hemispherical spore-sac. See Bennett and Murray's Cryptogamic Botany (1889), and H. N. Dixon's Student's Handbook of British Mosses (2nd ed. 1904).

Mossley, munic. bor. and mrkt. tn., Lancashire, England, 10 m. E.N.E. of Manchester; has cotton mills, foundries, and mill works. It has a handsome town hall. Pop. (1901) 13,452.

Mostaganem, fort. seapt., dep. Oran, Algeria, 45 m. N.E. of Oran. It has trade in wool, skins, and horses; potteries, flour mills, and tanneries. Pop. (1901) 17,485.

Mostar, tn. and former cap. of Herzegovina, on the Narenta, 47 m. s.w. of Serajevo (the capital); is the residence of a Greek and a Roman Catholic bishop. The district is noted for grapes and wine. Pop. (1895) 14,370. Most Favoured Nation

Most Favoured Nation Clause, when inserted in commercial treaties, binds the contracting parties to accord each to the other the same treatment as is given, or may be given, to the nation which is most favourably treated by each. The clause is sometimes restricted to one particular matter, but usually it is general, applying to all matters of trade and navigation. The clause is generally restricted to gratuitous concessions, and is not considered applicable to cases in which a third nation has obtained concessions by making a quid proquo. The modern device of using a maximum and a minimum tariff has tended to reduce the importance of this clause.

Mosul, cap. of vilayet of same name, Mesopotamia, Asiatic Tur-key, on the r. bk. of Tigris, opposite the mounds of ancient Nineveh, 220 m. N.N.W. of Bagdad. The vilayet is 29,220 sq. m. in area. The soil is fertile, but agriculture is in a backward state. The population is 300,000. The town, still partly walled, was very prosperous between the 10th and 13th centuries, and was for long afterwards a great trading centre, noted particularly for its manufactures of muslin, to which it gave its name. Its importance has greatly declined since the opening of the Suez Canal and the rise of Abu-Shehr (Bushire). The great mosque is the only remaining ancient building of interest. Mosul is the seat of a Jacobite patriarch. Pop. 40,000. Motala, tn., Swedish co. of Ostergötland, on Lake Wetter,

iron ships, railway engines, and machinery. Pop. (1900) 3,047.

Motanabbi, ABU-'L-TAYYIB AHMED-IBN-HOSAIN (915-965), Arabic poet, born at Kufa, on the Euphrates. Having played the prophet in the desert north of Syria, he frequented the court of Aleppo, and after that of Shiraz in Persia. He wrote courtly poetry, very highly esteemed by the Orientals.

mechanical workshops, the largest of their kind in Sweden, supplying

It has

42 m. W. of Norrköping.

Motet, a form of sacred choral composition of moderate length, set to Latin words, and from about the 14th century frequently used to supplement the service of high mass. Its music is written in one or other of the old ecclesiastical modes, and the theme is generally of a sacred character. as the melody of a plain chant; but secular melodies have also been utilized. Certain sections usually contain passages for solo, with choral accompaniment in florid counterpoint. The modern form of motet is written in conformity with the present system of music, contains an instrumental accompaniment, has never been adopted to any extent in the service of the church, and is in reality a form of sacred cantata. See Mass.

Mother Carey's Chicken. See Petrel.

Mother-of-Pearl. See Pearl. Motherwell, pol. bor. and tn., Lanarkshire, Scotland, 1½ m. from r. bk. of Clyde, 12 m. by rail S.E. of Glasgow, is a rich coal-mining district, and has iron and steel works. A growing industry is iron bridge building. The town possesses a large technical school and the Dalzell Jubilee Park. Pop. (1901) 30.418.

Motherwell, WILLIAM (1797-1835), Scottish poet, born in Glasgow. He became sheriffclerk depute of Renfrewshire (1819-29). He edited the Paisley Magazine and the Paisley Adrertiser (1828-30), and conducted the Glasgow Courier (1830). A grace-ful and vigorous lyrist, Motherwell has true pathos in Jeanie Morrison and other lyrics, and genuine movement and ring in his Cavalier songs and his ballads from the Scandinavian mythology. His Poems, Narrative and Lyrical appeared in 1832; en-larged and edited, with biography, by James M'Conechy (1846), and by William Kennedy (1848). A convenient reprint was issued in convenient reprint was issued in 1881. In 1819 Motherwell edited the Harp of Renfrewshire, by local authors; in 1827 a treasury of ballads, Minstrelsy Ancient and Modern; and in 1835 (with Hogg) an edition of Burns, with good notes. In 1832 he contributed a skilful preface to Henderson's Scottish Proverbs.

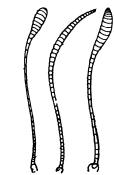
Motherwort (Leonurus car-

Motherwort (Leonurus cardiacal, a herbaceous plant belonging to the order Labiatæ. It occurs rarely wild in Britain, but is common on the continent of Europe and in N. America. It has whorls of pale reddish flowers, and its lower leaves are three-lobed. It was formerly used as a medicine, being suspected of expectorant properties.

expectorant properties.

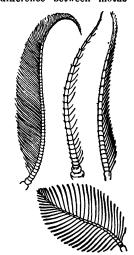
Moths, or HETEROCERA, constitute the second series of Lepidoptera, as contrasted with the

Rhopalocera, or butterflies. But while the butterflies form on the whole a natural group, the moths are a distinctly heterogeneous series, for the popular distinction that moths fly by night and butterflies by day is subject to very numerous exceptions. In most, though not in all, moths there is a curious hook-and-



Antennie of butterflies.

eye arrangement for fastening the two wings together, which is never present in butterflies. Again, while the antennæ of butterflies are clubbed, in moths they are variable in form, being only rarely clubbed. In addition there is generally some difference between moths and



Antennæ of moths.

butterflies as regards the nervures of the wing. Moths are far more numerous than butterflies, and vary greatly both as regards size and beauty of colour. Such forms as the ghost and swift moths (Hepialidæ) may reach an expanse across the

wings of six or seven inches, and are among the most brilliantly coloured of living insects. On the other hand, the small size and inconspicuous colouring of the clothes moths (Tineidæ) are familiar to all. There is great variation also as regards the habits and appearance of the larve. The concealed larve of the clothes moths are maggotlike in appearance; other forms are aquatic; while those of the Psychidæ construct cases which they carry about with them after the fashion of caddis-worms. As regards the adults, the most re-markable forms are the members of the family Syntomidæ, which often present an extraordinarily detailed resemblance to bees and wasps; no member of this family occurs in Britain. The only moth of direct use to man is the silkmoth (Bombyx mori); but a large number are of importance as destructive agents. See HAWK-MOTH, EGGER MOTH, BURNET MOTH, and so on; also LEPI-DOPTERA and BUTTERFLIES.

Motif, in music. See Leit-Motif and Wagner. Motion, Laws of. Newton bases his great work, the Principia, on three laws of motion, which are statements, partly by way of definition, partly by way of postulate, of fundamental dynamic conceptions. The first law asserts that every body left to itself, free from the action of other bodies, will, if at rest, re-main at rest, or will continue to move with constant velocity. It is usual to regard the first law as a definition of the property of The second law states inertia. that the rate of change of the momentum of a body measures in direction and magnitude the force acting on it. But ultimately our experience tells us only of changes of momentum, and from these changes we infer forces. To get into touch again with the universe, we need the third law, which states that to every action there is an equal and opposite reaction. We observe a certain kind of motion in the body B which is part of the universe U. We may for purposes of simpler treatment separate B from U by introducing in place of the action of U-B on B the force + F; and then the action of B on U-B will be representable by the force-F. In recent years attempts have been made to replace Newton's three laws by others more in harmony with our present scientific outlook. It is certain that, whatever improvement may have been effected in the logical statement of our fundamental dynamical principles, there has been elaborated no method better fitted than Newton's for teaching the untrained mind the practical use

dynamical method. See Mach's Development of Mechanics (Eng. trans. 1902), Ward's Naturalism and Agnosticism (1899). and Russell's Principles of Mathematics (1903).

Motive means in general what moves to action or appeals to the will. It is used to designate (1) the end or object aimed at in the action; and (2) the feeling or emotion which prompts the agent to seek the end-for example, the motive of a philanthropist's action may be said to be either the relief of suffering or the compassion which prompts him to seek its relief. The word intention' is often used in contradistinction from motive to designate the former, motive being then reserved for the latter exclusively, as by Mill, when he says, 'The morality of the action depends entirely upon the intention—that is, upon what the agent wills to do. But the motive—that is, the feeling which makes him will so to do—when it makes no difference in the act, makes none in the morality, (Utilitarianism, ch. ii.). And it is a disputed question in ethics whether the intention or the motive (in this narrower sense of the term) is to be regarded as the true object of moral judgment. Mill in the above passage and utilitarians as a school take the former view; Martineau, in his Types of Ethical Theory (1866), is a prominent representative of the latter. (See for brief statement and criticism Sidgwick's Methods of Ethics, bk. iii. ch. xii., 1893.) Another usage (cf. Green's Pro-legomena to Ethics, s. 103 ff., 1883) would restrict the term motive to that aim or end which actually determines the agent in any given case, and to which among conflicting desires he gives the preference. But this restriction of meaning is at variance with the ordinary usage of the term, which recognizes a conflict of motives.

Motley, JOHN LOTHROP (1814-77), American historian, was born at Dorchester (now absorbed in Boston), Massachusetts. He spent a year in Europe, studying at Göttingen, where he had as a fellowstudent Bismarck, with whom he later became a warm friend. Appointed secretary to the United States legation in St. Petersburg, Motley spent a few months (1841-2) in Russia. His Peter the Great and Russia, appearing in the North American Review (1844), may be said to be his début in the character of a historian. Thereon followed essays on Balzac and the Polity of the Puritans (1845-7). His Romance of the Massachusetts Colony (1849) bespeaks the powers of a historian rather than of a story-

teller. After five years (1851-6) of laborious investigations in the archives of Berlin, Dresden, the Hague, and Brussels, he published (1856) History of the Rise of the Dutch Republic, narrating the history from the abdication of Charles v. to the assassination of William the Silent (1555-84). The work was at once greeted with the most cordial appreciation. After resting a year in America, Motley returned (1858) to England and continued his historic studies, which bore fruit in his second great work, History of the United Nether-lands (1860-68). Minister to Austria (1861-67), his third instalment of his history was published in 1868. In 1869-70 he was minister to Great Britain. He next removed to the Hague, where he wrote John of Barne-veld (1874). See Memoir by Oliver Wendell Holmes (ed. 1898), and his Correspondence, ed. G. W. Curtis (1889).

Motmot, member of a family of American birds related to the kingfishers. Together with the todies, they constitute the family Momotide. The usual tints are green, blue, brown, and black; the plumage is loose, and the tail long. The birds inhabit dense forests in Mexico and S. America. and feed on insects, small rep-tiles, and fruit. The eggs are laid in holes in trees or banks,

without any nest. An example is Momotus brasiliensis, a bird with a long racket-tipped tail.

Motor Boats. The first motor boat was shown at the Paris Exhibition of 1889, being fitted with the petrol motor invented by Daimler. Within the last three years the success of the motor on the road has encouraged boatbuilders to apply the petrol engine to small craft, while the institution of international races has given further stimulus to the in-dustry. The Fishery Board of Scotland is demonstrating the value of the motor boat to the fishing industry; the National Lifeboat Institution is experimenting with various types of motors in connection with its boats; and our rivers and coasts are giving evidence of the popularity of the motor boat for pleasure purposes. At the exhibitions in London and Paris in the winter of 1905 several motor boats were shown, the attractions of the latter display including a racing-boat fitted with a 16-cylinder petrol engine of 180 h.p. and a Delahaye 4-cylinder marine petrol engine of no less than 300 h.p. The English authorities in connection with motor - boating are the Motor Yacht Club, the British Motor Rest Club, and the Motor Metal Boat Club, and the Marine Motor Association,

Motor Cars and Motor Cycles. An English patent for a horseless carriage was taken out by Ramsay and Wildgoose in 1619, but to the Frenchman Cugnot belongs the credit of having been the first to make a vehicle to actually run upon the road. That was in 1770, when the carriage, mounted on three wheels, carried two people at the rate of two miles an hour. Murdock, in 1784, ran the model of a wagon in which power was obtained from a high-pressure noncondensing steam engine. About the same time Symington constructed a steam carriage with the propelling power at the rear. Richard Trevithick was, however, the pioneer of road locomotion on common roads in Britain in 1801. In 1803 a new carriage was brought out with a horizontal, instead of a vertical, boiler. The crank-shaft was connected by gearing to the driving wheels, which were of exceptionally large diameter - viz. ten feet. With that carriage a speed of ten miles an hour was attained. Among early efforts to secure the mechanical propulsion of vehicles was the provision of iron pivoted legs, which, as in Brunton's 'mechanical traveller' of 1813, had, when in operation, resemblance to a man walking. Later, Gordon developed the same idea. Burstall and Hill were the next conspicuous inventors; but their carriage, weighing about eight tons, was unable to attain anything like adequate speed. W. H. James, in 1823, made a step forward with a carriage in which a tubular boiler was employed for the first time. Six years later a vehicle made by this inventor, in conjunction with Sir J. Anderson, made trips at twelve miles an hour, carrying fifteen passengers. But an even more prominent pioneer was Sir Goldsworthy Gurney, who took out his first patent for steam carriages in 1825. By 1828 he was able to make a journey from London to Bath, and a few years later a regular service of steam coaches was established between Gloucester and Cheltenham. Hitherto steam carriages had been designed for passenger service, and had weighed two tons or more. Gurney was the first to attempt a vehicle to do the work of one horse, carry two or three people, and weigh only about five cwt. Greater success was attained by Walter Hancock, who, according to Sir F. Bramwell, constructed steam carriages that were quieter in running than some of the steam conveyances of recent years. Among the improvements Hancock effected was a boiler working at a steam pressure of 100 lbs. per square inch-

more than double the pressure previously utilized. Maceroni, Nasmyth, Dance, Heaton, Som-ers, Ogle, and Church were among others who made considerable advance, the latter designing a double-decked steam omnibus to carry fifty passengers. But the opposition of the turnpike trustees, and the growing development of the railroad, fostered a prejudice against the mechanical road carriage. During 1832 no fewer than fiftyfour bills were introduced into Parliament with the object of making steam carriages subject to special taxation. On the Ashburnham and Totnes road the toll on mechanically-propelled carriages was £2, that for a coach and four horses was only 3s. From 1860 to 1870 legislation was enacted which effectually silenced inventors interested in the automobile, and it was not until 1896 that the Locomotives on Highways Act again made possible the presence of the mechanical road car on

the British highway.

The high-speed internal-combustion motor Gottlieb Daimler revolutionized the whole subject. In 1884 he patented an engine in which the propelling power was produced by the rapid combustion of carburetted air in a cylinder on the Otto principle. (See below.) Two years later he fitted the engine to a bicycle. The French and Belgian rights to construct his motor were acquired in 1889 by Messrs. Panhard and Levassor, whose first car was made in 1891. Another pioneer with the petrol engine was Benz, who in 1885, working independently of Daimler, produced a mechanically-propelled tricycle.

There are three distinct types of motor cars, so far as the propelling power is concerned—petrol, steam, and electric. On the Continent much attention is being devoted to cars using alcohol as fuel; but in their general arrangement they are identical with those employing a mineral product. Experiments have also been made with acetylene, naphthalene, ether, and compressed air.

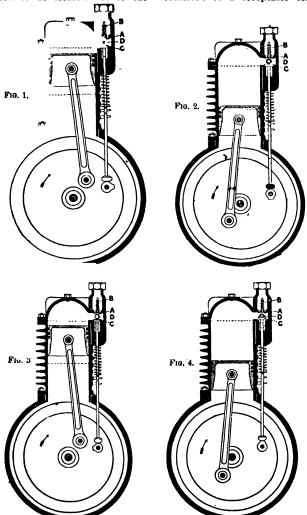
Petrol Cars.—Efforts have been made to utilize ordinary petroleum or parafin as the fuel for the internal-combustion engines of automobiles, not only because of its relatively low cost and greater safety as compared with petrol, but also on account of the facility with which it can be obtained. One of the chief difficulties, however, is that petroleum can only be vaporized when subjected to great heat, this being usually effected by injecting it in the form of a fine spray into a heated chamber be-

fore it is admitted to the combustion head of the engine. Other drawbacks have been fouling of the valves and cylinders, owing to the residue, and the somewhat obnoxious products of combustion. By far the greater number of cars use petroleum spirit, known also as petrol and motor spirit. The petrol engine works on identically the same principle as the gas-engine, the main dif-ference being that its 'gas' has to be made as the car travels along. A supply of petrol and a gas-maker, known technically as a carburettor, are all that is necessary. Petrol engines are of two general types. In one, the series of operations requires four strokes—two up and two down—to complete the cycle, and for this reason it is called a fourcycle motor, this being the type almost universally employed on automobiles. The other requires but two strokes - one in each direction-of the piston to complete the cycle, and is therefore termed a two-cycle engine.
The latter is extensively employed in America on small motor launches. The four-cycle engine was originally proposed by a French engineer, M. Beau de By a French engineer, M. Bean de Rochas, and was later put into practical form by Dr. N. A. Otto, who brought out his first gas-engine on this system in 1876. The principle of operation of fourcycle engines is shown diagrammatically on the following page in Figs. 1-4. The first action, that of drawing in through the inlet valve, A, a quantity of air car-buretted with the vapour of petrol to form an explosive mixture or charge, is shown in Fig. 1. As the piston travels downward in the cylinder, the suction thereby created overcomes the tension of the spring B, and allows the inlet valve to open and admit the mixture; the valve remains open until the piston reaches the end of its first outward stroke. The next, or compression stroke, is shown in Fig. 2. Both the inlet valve A and the exhaust valve C are closed, and as the piston moves upward the charge is compressed into the space forming the combustion chamber, between the piston and the cylinder head. The volume of gas which filled the whole of the cylinder and combustion chamber is now compressed into the latter—a space equal to from & to 10 of the whole.

By means of suitable external mechanism, known as the contact-maker, an electric spark is caused to jump across the terminals of the sparking plug D when the piston reaches the end of its first return or compression stroke. The compressed charge of explosive mixture is thus ignited, and, the gas ex-

panding rapidly, the piston starts on its second outward impulse or working stroke (Fig. 3), the two valves still remaining closed. Just before the impulse stroke is completed, the exhaust valve C is opened by suitable mechanism to allow the products of combustion to be cleared out of the

carburettor from becoming too cold for successful evaporation of the spirit, the air for the carburettor is usually taken from a point close to a heated part of the engine. In the earlier vehicles what is known as a surface carburettor was employed. This consisted of a receptacle con-



Diagrams of Action of Four-Cycle Engine.
(For explanation, see text.)

cylinder as the piston rises for the second return stroke (Fig. 4). When this stroke is completed the inlet valve again opens, and another charge is drawn in by the piston and the cycle is represented.

piston, and the cycle is repeated.
The vapour of the petrol and
the air are mixed in the carburettor. To prevent the air and the

taining the petrol, across the surface of which air was drawn, so that it became mingled with the vapour of the spirit. Among the drawbacks of the surface carburettor were its relative excessive size, and the inability to prevent splashing, which caused a constantly changing quality of

the mixture. Another disadvantage was that, petrol not being a homogeneous product, but a mixture of many compounds and varying degrees of density, the lighter constituents evaporated first, leaving behind those which were too heavy or 'stale' to give a good mixture. Most modern carburettors are fitted with a float-feed chamber and a mixing or spraying chamber. The first is a receptacle in which a small supply of petrol is maintained at a constant level. The petrol usually flows by gravity from the main tank to this chamber, the float rising as the petrol flows in until the desired level is reached, when the inlet is closed by means of a suitable valve. The mixing chamber comprises a nipple through which the petrol is sucked, partly by the engine, and partly by the stream of air with which it is mingled by being sprayed from the nipple against a cone. Although most carburettors will work under ordinary variations of motor speed without changing the adjustment of the air inlet, it is impossible under such conditions to secure the maximum efficiency of the engine at more than one speed. With the view of remedying this, automatic carburettors have lately been devised which provide a uniform quality of mixture at all engine speeds. These act chiefly by means of the provision of an auxiliary air inlet, the opening in which is varied by a spring, either in accordance with the intensity of the suction of the engine, or in proportion to the opening or closing of a throttle valve. The correct a throttle valve. mixture of petrol vapour and air cannot be definitely given, bethe quality of the gas and the temperature of the atmosphere. Thus on a cold day, especially at starting, the mixture may be in the proportion of four parts of air to one of petrol vapour, while under favourable conditions it may be as high as fourteen to one. To permit of the proportion being varied, a lever is provided in conjunction with the carburettor, by means of which the amount of air drawn in may be regulated.

Having obtained a charge of mixture in the cylinder, it is necessary to compress the same. This heats the gas, and both the higher temperature and the higher pressure favour ready ignition and quick combustion. The next operation is that of igniting the charge. In the early days of the petrol car this was effected by means of a platinum tube maintained in a state of incandescence by an external flame. This was, however, soon superseded, as the employment of an external flame

in proximity to petrol resulted in several cars being destroyed by fire. At the present time, the method most commonly employed is to introduce through the walls of the cylinder an insulating porcelain tube, carrying the wires which form part of the secondary circuit of an induction coil. The inner ends of these wires are brought near together, leaving a small gap in the circuit across which the electric current jumps in the form of a spark when the circuit is closed externally. There are two principal systems of electric ignition. The high-tension system consists essentially of a primary (dry) battery or a secondary battery (accumulator)—the latter being the type most usually adopted in Britain an induction coil, and a contact-maker. In the magneto system-either high or low tension a magneto, driven by the engine, is employed to generate the electricity required. In the high tension system the employment of an induction coil is rendered necessary, because the compressed charge in the combustion chamber offers considerable resistance to the bridging by the electrical current of the gap between the two points of the sparking-plug. It is neces-sary that the spark by which the charge is fixed shall take place at the precise moment in the cycle, and this is effected by the contact-maker already mentioned, by which the electrical circuit is closed at every second revolu-tion of the engine crank shaft. In the low-tension magneto system, what is termed the magneto is practically a form of dynamo generating a low-tension current. which is passed into the combustion chamber, where the spark is caused by mechanically separating two points forming terminals of the circuit, and these take the place of the sparking-plug in the high-tension system. As in the latter, provision is made for advancing or retarding the ignition, in order to vary the speed of the motor. Still another type of ignition is that in which a magneto is used in conjunction with an induction coil to furnish a high-tension current.

At the end of the impulse stroke of the petrol motor the pressure of the burnt gases in the cylinder is from 40 to 50 lbs. per sq. in., and if they are discharged directly into the atmosphere a deafening noise is produced. To avoid this, an apparatus known as a silencer or exhaust box is employed, in which the gases are gradually expanded into the atmosphere.

At the moment of explosion the temperature within the cylinder is about twice that of the

melting-point of cast iron, and as the explosions take place at the rate of from 50 to 1,250 per minute, the cylinder would get so hot that the piston through expansion would eventually 'seize' or stick in the cylinder. In low-power motor cycles the movement of the machine through the air is relied upon to keep the cylinder cool, the latter being provided with a number of webs or radial ribs cast on it to increase the radiating surface exposed to the With the exception of those on motor cycles, the cylinders of automobile petrol engines are provided with jackets, through which water is rapidly circulated. To prevent the water from boiling away, a radiator forms part of the engine-cooling system. Though varying in shape and style, its purpose is that of causing the water to pass through a large area of tubes, the outer surface of which can be acted upon by the atmosphere. There are two ways of circulating the water through the cylinder jacket. One is known as the natural or thermosiphon system, and can be likened to the arrangement adopted in the ordinary household hot-water supply. In the second system the water is circulated by a small pump driven by the engine. In certain cases the various parts are so arranged that, should the pump fail to work, the circulation will still be maintained by gravitation. At present the almost universal practice for large cars is to combine the tank and radiator in one structure, which completely fills the front opening of the motor bonnet. It is possible to cool the cylinders of a 40-horsepower motor with a few quarts of water, used over and over again, with merely nominal evaporation.

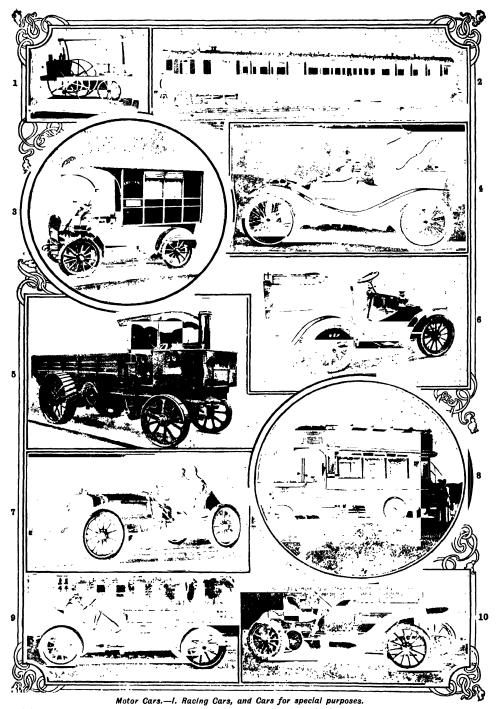
The speed of the motor can be varied in several ways: one is by advancing and retarding the ignition as already explained, and another is by varying the quality and quantity of mixture supplied to the combustion chamber. The general practice is to insert a throttle valve in the admission pipe controlled by a foot lever or a hand lever. As a matter of fact, a four-cylinder engine has a range of flexibility which in the hands of an expert driver approximates that of a steam-engine. The majority of petrol motors are fitted with a governor, acting on a throttle on the gas admission pipe, to prevent them from 'racing' whenever the load is reduced.

While steel is occasionally employed, the cylinders of petrol motors are usually made of cast iron, the water jackets forming part of the casting. The piston consists of a circular casting open at one end. Although it is made to fit the cylinder as

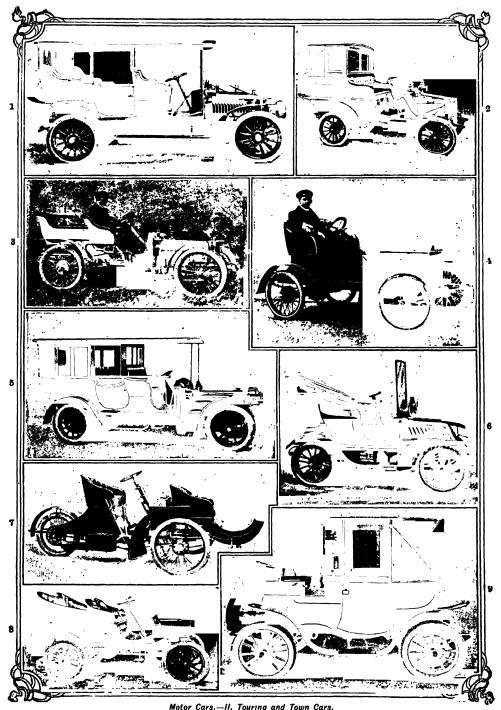
closely as possible, and is yet free to move up and down within it, there would be a leakage of the gas before and after the explosion unless special means for making a tight point were provided. To this end piston rings are fitted into grooves formed in the outer surface of the piston. These rings are made of cast iron to a diameter slightly larger than the diameter or bore of the cylinder, and eccentric; they are split at one point and forced over the piston into grooves. The reciprocating motion of the piston is converted into rotary motion by means of a connecting rod attached to the piston at one end, and to a crank on the engine shaft at the other.

Inlet valves, by means of which the explosive mixture is admitted to the combustion chamber of the engine, are of two kinds-(1) those which are opened automatically by the motor itself on its suction stroke, and (2) those which are mechanically operated. The exhaust valve—i.e. the valve by which the burnt gases are allowed to pass out of the engine -is mechanically operated, and is opened at every alternate upward stroke of the piston by means of a cam, mounted on a small shaft which runs at half the speed of the engine shaft from which it is driven by small gear wheels. Unlike the steamengine, the motor must be put in operation before an explosion can take place, and before any power can be developed; moreover, it cannot develop much power at slow speeds. These difficulties have been overcome by the use of gears and clutches, which permit the engine to travel at a speed higher than that of the car, or to work when the vehicle is at rest. Ease of starting and steadiness of operation are secured in the highest degree in a multi-cylinder engine. The four-cylinder motor has usually one cylinder full of mixture, and near the ignition point. If the compression is good, a very small fraction of a turn of the starting handle will cause an explosion. Frequently, indeed, such an engine will start without the starting handle being touched, as soon as the current is switched on and the ignition lever slightly manipulated.

In the early cars the method of applying the power to the propulsion of the vehicle was effected by means of belts working on fast and loose pulleys, so that by slipping the belts on to the loose pulley the engine could be instantly disconnected from the driving mechanism whenever desired. Usually there were as many belts as there were speeds, a reverse motion being



Early motor car (Murdock's, 1784).
 Great Western Railway motor carriage for quick suburban branch service.
 Lauchester military car.
 Straker torry for War Department.
 Wolseley commercial motor car.
 Richard-Brasier racing car, winner of Gordon-Bennett Cup, 1905.
 Postal motor ombus, 181e of Wight.
 Neper six-cylinder racing car.
 In Mercedes racing car.



Motor Cars.—II. Touring and Town Cars.

1. Panhard and Levassor 24 h.p. touring car. 2. White steam landaulette. 3. Arrol-Johnstone car, winner of Tourist Trophy, Isle of Man.
4. Rover: 100-guinea car. 5. Daimler car, supplied to H.M. the King. 6. De Dion 6 h.p. light car. 7. Singer 6 h.p. tri-car. 8. Oldsmobile 9 h.p. angle cylinder car. 8. Electric brougham, City and Suburban Electric Carriage Co.

the pleasure steam-cars at present in use are provided with flash boilers, on account of their reduced risk of explosion, this departure dating from M. Serpollet's experiments of 1888. In these generators, instead of a volume of water being heated to boiling-point, a certain quantity is injected into a heated coil at each stroke of the engine and instantaneously converted into steam and superheated. No mechanical speed-change gear is necessary in a steam-car, the variation in speed being obtained by a throttle-valve; while to drive the car in a backward direction it is only necessary to reverse the engine. A large number of light steam-cars have come from America; but they are somewhat lightly constructed, while few of them are able to run more than 25 miles on one supply of water and fuel. These vehicles are fitted with a light type of fire-tube boiler, heated by a burner using petrol as fuel. The steam is conveyed to a double-cylinder vertical engine, driving di-rectly by means of a chain on to the centre of the rear live axle. An automatic regulator is provided to feed the petrol to the burner at a predetermined rate, so as to keep the steam pressure at the desired limit. Since then other types have been developed both in the United States and in Europe, in which the consumption of fuel has been reduced; and by the provision of arrangements for condensing the waste steam, modern cars are not called upon to make such frequent stops for replenishment of the fuel and water supply.

Heavy steam wagons are also made for the conveyance of loads up to five tons. The majority of these are fitted with a fire-tube boiler, fired either by coke or coal, the steam being utilized to drive a horizontal compound engine. The engine does not drive the vehicle direct, but through gearing arranged to give two speeds.

Electric Automobiles.—It was not until 1887 that the first attempts at electric traction on roads were made, by M. Gustave Trouve in Paris and Mr. Magnus Volk at Brighton. Little progress was, however, made until M. Jeantaud entered an electric carriage in a race held in France in 1897. The current was furnished by a heavy and inconvenient battery of accumulators, which had to be recharged about every 16 miles. To obtain the necessary rotary motion, one or two motors are employed, their power being conveyed to the road wheels either through gear wheels or chains. The speed of the vehicle is regulated by a device known as a controller,

which is so connected up to the battery and the motor that the former may be divided into different groups, and the current of only one or more groups utilized; while the power of the motor may be altered and its direction of running reversed, converting it into a powerful brake. The electric carriage is the most cleanly in use and the quietest in operation. Even where current can be obtained, considerable time is occupied in recharging the battery. Hence the electrical car is practically confined to town work. It is, however, the easiest to operate and control, and when at rest no part of the mechanism is in operation. The lead plates in use to-day give from 10 to 12 watt-hours per pound. The battery usually forms about 33 per cent. of the total weight of the carriage. At a speed varying from 12 to 15 miles an hour a distance of from 35 to 40 miles is obtained upon one charge of the batteries; where longer distances are required, a system of interchangeable batteries is adopted. The cost for electrical energy works out at a penny per ton mile, as against the 20 to 50 mile run at threepence per ton mile possible in 1896. The longest known run on one charge of an electrical vehicle was made in October 1901 by a Krieger car, weighing 2'45 tons, which covered a distance of 190 miles. The battery consisted of 60 cells, of a capacity of 400 ampère-hours. To increase the ampere-hours. To increase the popularity of the electrical vehicle, what is needed is a battery of accumulators able not only to propel a carriage a distance of from 60 to 70 miles on one charge. but to be quickly recharged, and weighing not more than ten or fifteen per cent. of the total weight of the car-a problem now exercising the minds of many experimenters in the electrical world. The Edison or Junger nickel-iron batteries have not yet been tried a sufficiently long time for any opinion to be given as to their future commercial value. Certain disadvantages attend their use. The electrolyte-caustic potash is a rather more objectionable ma-terial to deal with than sulphuric acid. The voltage is so low that seventy cells will have to be used where forty-four now suffice, while the relation of bulk to capacity is entirely in favour of the lead battery.

A brief reference should be made to the petrol-electric car, the object of which is to provide a car capable of travelling long distances without frequent stoppages for the replenishment of the fuel supply, with the easy control and the smooth and quiet running of the electrical system.

In these cars the change-speed gear and its connections are replaced by a dynamo driven by the engine, and the electrical energy generated is utilized in operating one or more electric motors, which in turn propel the vehicle.

With reference to the automobile movement itself, a pioneer in Britain is Sir David Salomons, Bart., who in 1895, at Tunbridge Wells, organized the first exhibition of motor cars in Great Britain. Two years later, after the passing of the Act of 1896, by which motorists were per-mitted to drive motor vehicles on the public roads without being preceded by 'the man with the red flag, came the establishment of the Automobile Club of Great Britain and Ireland. The club's annual reliability trials have provided a series of tests in which manufacturers have gained experience from each other's failures and successes. Whilst the British club, with its affiliated organizations in Scotland, Ireland, Wales, and all the districts of England, is regarded as the central authority of automobilism in the United Kingdom, the Automobile Club de France is recognized as the headquarters of the interna-tional movement. This club was founded at Paris in 1896, and has played a controlling part in the development of motor-car racing. The initial contest for 'carriages without horses' was run between Paris and Rouen in 1894, being won by a De Dion steam tractor. In the following year a great race from Paris to Bordeaux and back—a distance of 750 miles was won by Levassor on a Panhard car driven by a 4 horse-power engine, his time being 48 hours 48 minutes. That event was also notable as being the first occasion of the appearance of pneumatic tyres in connection with long-distance motor travelling. Since then the horsepower of the engines employed has increased until vehicles of 15 horse-power, 20 horse-power, and 30 horse-power are commonly used for touring. Monsters with 100 horse-power engines are familiar in connection with racing. world's record, made on the Arles: Salon road, France, by Hémery, on a Darracq 8 cylinder 200 horsepower car, on Dec. 30, 1905, is 201 secs. for the kilometre, equal to 109 miles per hour. Baras, a French driver, at Ostend in November 1904, attained a speed equal to 1043 miles per hour over the flying kilometre. To over the hymk knohere. To encourage the sport further, Mr. Gordon Bennett offered a trophy to the French club for international competition. This was won in 1900 by M. Charron (France), on a Panhard car, at the rate of 38‡ miles per hour; in 1901 by M. Girardot (France), also on a Panhard, his speed being 35‡ miles per hour; in 1902 by Mr. S. F. Edge (England), on a Napier, at the rate of 34 miles per hour; in 1903 by M. Jenatzy (Germany), on a Mercedes, at the rate of 49‡ miles per hour; and in 1904 and again in 1905 by M. Thery (France), on a Richard-Brasier. An international contest for motor cycles was established in 1904.

With the Motor Car Act of 1903, automobilism entered upon a new era. This act enforces registration of cars, licensing of drivers, a speed limit of 20 miles an hour, regulates the lighting of vehicles, and renders those who drive recklessly subject to severe penalties. On the application of local authorities, too, the Local Government Board has power to reduce the speed limit or to prohibit motor cars from any roads it may schedule. The act continues in force till the end of 1906, when the whole subject will be reviewed by the legislature. In September 1905 a royal commission was appointed with this object, and reported in July 1906. Among the recommendations made were: (1) the abolition of the 20-mile limit, except for villages and small towns, where the maximum should be 12 miles an hour, reliance to be placed on the general law pro-hibiting driving to the common danger; (2) a higher scale of duties on motor cars, the proceeds to go towards road upkeep; (3) emission of smoke or vapour in offen-sive quantities, or allowing excessive noise or vibration, should be punishable offences. Moderation in the use of sirens and horns is also suggested.

A Motor Volunteer Corps was officially gazetted in 1903. In the fire service, in connection with hospital and ambulance work, and in various other ways, the motor car has proved its adaptability, while the numerous motor-omnibus services now being established lead to the hope that it will prove a factor in solving the difficulties of rapid transit in

cities and towns.

See W. Fletcher's History and Development of Steam Locomotion on Common Roads (1891); L. Lockert's Petroleum Motor Cars (1898); G. D. Hiscox's Horseless Vehicles (1900); Rhys Jenkins's Motor Cars and the Application of Mechanical Power to Road Vehicles (1902); Sir Henry Thompson's The Motor Car (1902); W. Worby Beaumont's Motor Vehicles and Motors (1900-5); The Automobile, based on Lavergne's L'Automobile sur Route (trans. and ed. by P. N, Hasluck; new

ed. 1905); R. J. Mecredy's The Dictionary of Motoring (1903), H. L. Lewis and W. H. Porter's The Law Relating to Motor Cars (1904); A. B. Filson Young's The Complete Motorist (1904); Holden-Stone's The Automobile Industry (1905); W. Fletcher's English and American Steam Carriages and Traction Engines (1904); Motors and Motor Driving, ed. by A. C. Harmsworth, Badminton Library (3rd ed. 1904); The Automobile Club of Great Britain and Ireland (1904); The Law of Motor Cars and other Carriages, by G. A. Bonner (1904); Motor Car Law, by H. G. Farrant (1904); and The Motor Year Book.

Motril, city, prov. Granada, Spain, on Mediterranean, the ancient port of Granada, from which it lies 33 m. s. Wine, sugar-cane, and subtropical fruits are grown. There are Moorish ruins. Pop. (1900) 18,528.

Motto, in heraldry, a pithy word or sentence forming an integral part of the achievement, usually in England and Ireland placed under the shield, and in Scotland above the crest. The slogans or war cries of the old families are by some regarded as the forerunners of the motto. These were universal among all nations, and in Scotland were particularly numerous.

Mouflon (Ovis musimon), the

Mouflon (Ovis musimon), the wild sheep of Europe, now found only in Corsica and Sardinia. See SHEEP.

Moukden. See Mukden.

Mould, a name commonly given to a variety of fungoid growths, usually of filamentous structure, and bearing spores on the summits of erect branches. They usually grow on damp animal or vegetable material, such as meat, jam, boots, clothes, paper, and so on. Certain of the moulds are highly destructive to vegetable crops, notably Peronospora infestans, which attacks the potato. Mouldings. See Joinery.

Moulins (anc. cap. of Bourbonnais), cap. of dep. Allier, France, on r. bk. of Allier, 194 m. by rail s.E. of Paris; has engineering, glass, and cabinet-making works, and hat factories; also a 15th-century cathedral, and the ruined castle of the dukes of Bourbon. Pop. (1901) 22,340.

Moulting, the process in which birds get rid of and renew their feathers, and Crustacea and insects cast off and renew their chitinous cuticle. The term may also be applied to the quite analogous processes in the course of which mammals shed their hair and snakes slough their skin.

and snakes slough their skin.

Moulton, Ellen Louise
CHANDLER (1835), American
writer, born at Pomfret, Connec-

ticut; married, 1855, William Moulton, publisher, Boston. Mrs. Moulton's works include volumes of stories, verse, travel, and tales for children. She edited the collected poems of Philip Bourke Warston (1892)

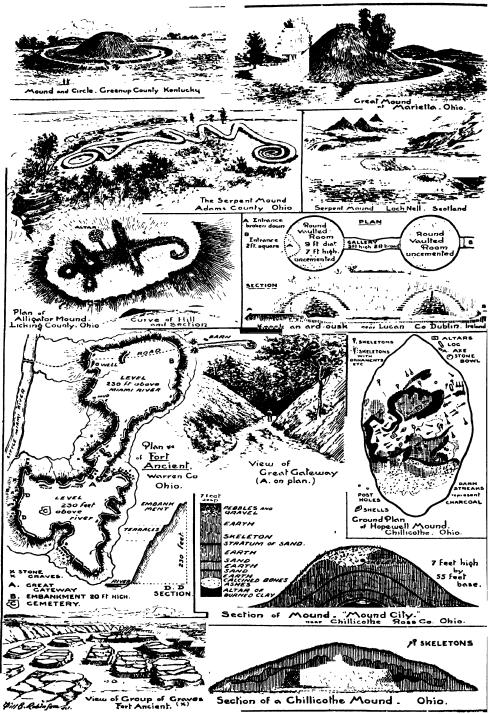
Marston (1892).

Moulton, John Fletcher (1844), English barrister and politician, was born at Madeley, Salop; graduated as senior wrangler and first Smith's prizeman at Cambridge (1868). Called to the bar (1874), he rapidly acquired a large practice, especially in patent cases. In Parliament he has represented Clapham division (1885-6), South Hackney (1894-5), and Launceston division of Cornwall (1898-1906). In January 1906 he was appointed one of the Lords of the Court of Appeal.

Moultrie, JOHN (1799-1874), English poet, was born in London, of a Scoto-American family. He became rector of Rugby (1828), where he was the close friend of Dr. Arnold. Moultrie is chiefly remembered for certain sympathetic short poems, and for his Godiva (1820), once greatly admired. He published a volume of collected verse (1837), The Dream of Life (1843), and Altars, Hearth, and Graves (1854). His Collected Works were published in 1876. See Memoir by Derwent Coleridge, prefaced to complete edition of Moultrie's Poems (1876).

Mound Birds, or MEGAPODES, are game birds, which do not incubate their eggs, but deposit them in a mound composed of earth and decaying vegetation. The heat produced by the rotting leaves is sufficient to ensure the hatching of the eggs. One of the most familiar of the megapodes is the brush-turkey (Catheturus Lathami) of E. Australia. mounds are sometimes six feet high, and are constructed in level clearings; the cocks seem to assist in the building, and the same mound is apparently utilized by more than one female. As many as forty eggs have been found in one of these mounds. Another example is the native pheasant (Leipoa ocellata) of S. and W. Australia, which differs but little in habits from the brushturkey. Other species occur in the Philippines, New Hebrides, and in the islands of the Malay Archipelago.

Mound Builders, a term applied by some ethnologists to a hypothetical extinct people, precursors of the present N. American Indians, who are credited with the erection of the prehistoric earthworks of all kinds—forts, ramparts, barrows, mounds—strewn over the Mississippi basin and other parts of the United States, but numerous especially in the Ohio valley. The whole field has been care-



Some noted Mound Buildings.

fully studied both by W. K. Moorehead, who upholds the pre-historic theory, and more recently by Cyrus Thomas, who attributes these remains not to the 'pre-cursors' but to the ancestors of the present aborigines; and this view is now generally accepted as most in accordance with all the known data. Thomas classes the mounds in a number of separate zones, such as the southern, which is distinguished by flattopped structures surmounted by fortified enclosures, somewhat analogous to the Mexican teo-calli. Another distinct class is the effigy mounds, which assume the form of saurians and other animals, and are restricted to the former territory of the Winne-bago Siouans in Wisconsin and Illinois. In Ohio the largest mound is Fort Ancient, a mile long, with over ten miles of artificial work. Chillicothe, on the Scioto River, is the centre of several important groups, such as those of Hopewell, Hopeton, and Mound City. Many were obvi-ously sepulchral barrows, and contain human remains and various objects, such as earthenware (often of artistic design and claborate workmanship), finely-chipped flints, hammered copper brace-Thomas concludes that many of the mounds are recent (post-Columbian). It is highly probable that many were the work of the Cherokees, who indeed claim to have raised those which give its name to Grave Creek at the head of the Ohio.

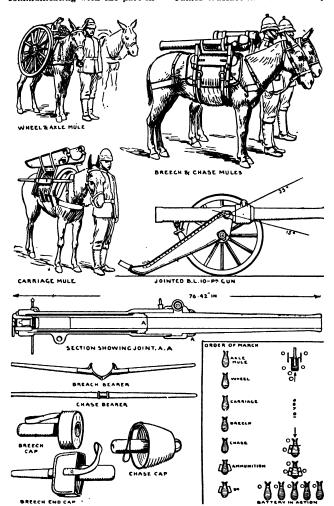
See W. K. Moorehead's Primitive Thomas's 'The Mound Builders,' in 12th Annual Report, Washington Bureau of Ethnology (1891).

Mound Dwellings. The custom of living in subterranean

and semi-subterranean dwellings was at one time very widespread. To distinguish between truly not distinguish between truly underground dwellings and mound dwellings is often difficult. The latter appear to be more especially associated, in recent centuries, with the hyporborean races. Thus, the Onkilon, precursors of the Chukches on the Acetic aboves of NE Siberia Arctic shores of N.E. Siberia, dwelt in earth-huts, which had the form of small mounds, half sunk in the ground and closed above with whale ribs, and were covered with a thick layer of earth. These appear to have been almost or quite identical with the yurts used by the former natives of S. Kamchatka and by their kindred in the Alcutian Islands. James Hall describes the winter dwellings of the Greenland Eskimos in 1606 as being similar. The Moravian missionaries at Hopedale, Labrador, speak of three Eskimo mounds at that place, which only became deserted during the 19th century.

Sir A. de Capell Brooke (1827), describing the winter dwelling of the Lapps, says: 'In form it (the gamm, or hut) is generally circular, or oblong, having the appearance of a large, rounded hillock. The entrance is by a low narrow passage, at the extremity of which is a door, communicating with the part in-

neys (1869): 'A green conical mound, with an entrance passage, about eighteen inches high and two feet broad, leads from the lower side into the interior of the prehistoric dwelling.' 'Many of these hillocks are found upon the seaside of almost all the islands of Orkney,' remarks Dr. James Wallace in his Account of



A Mountain Battery.

habited.' But much more elaborate was the mound built in the 9th century in the Namdal district of Norway by two brothers named Herlaug and Hrollaug. In Scotland we find many varieties of the mound dwelling. One notable example is thus described by Daniel Gorrie in Summer and Winter in the Ork-

the Islands of Orkney in 1700. Perhaps the earliest instance of a mound dwelling described from the scientific point of view is that of Knock-an-ard-ousk, near Lucan, County Dublin, which was discovered about 1724, and of which the ground-plan and sectional view are given by Walter Harris in his Works of Sir James Ware (1764).

Moundsville, city, W. Virginia, U.S.A., the co. seat of Marshall co., on the Ohio, 12 m. s.w. of Wheeling. Pop. (1900) 5,362

Mounet-Sully (1841), stage-name of Jean Sully Mounet, French tragedian, born at Bergerac; made his début at the Odéon (1868) in Paris, and in 1872 appeared at the Comédie Française. Mounet-Sully's greatest rôles are Achilles, in Iphigénie; Hyppolytus, in Phèdre; the King, in Le Roi s'Amuse; and Hamlet. He visited London with the Comédie Française in 1894; has written a drama, La in 1891; nas minus.
Buveuse des Larmes.
See Rowan.

Mountain Battery is intended for use in mountainous countries where wheel-transport is impossible or very difficult. The gun-carriages are taken to pieces, and, with the guns, packed on mules, other mules carrying the ammunition-boxes and all stores and baggage. The guns (of which each battery has six) are very light and of 2.5 inch calibre, or else 7-pounders and muzzle-loading. The personnel (exclusive of the muleteers) forms part of the Royal Garrison Artillery. There are 8 mountain batteries in the British army, all of which are stationed in India.

Mountaineering. It is not till well into the middle ages that we hear of any one ascending a mountain for pleasure. In 1265, or thereabouts, King Peter of Aragon climbed, it would seem purely as an adventure, the Canigou in the Eastern Pyrences. Some half-century later, Petrarch ascended Mont Ventoux, near Avignon, and on his return wrote what may be called the earliest modern example of the treat-ment of natural scenery as a text for moral reflections. The Roccia Melone (11,600 ft.), near Mont Cenis, which in the middle ages enjoyed the reputation of being the highest mountain in Savoy, was ascended in 1358 by Bonifazio de' Rotari, a gentleman of Asti.

By the end of the 15th century we read of a class of professional hunters, of whose services kings and princes avail themselves. The Emperor Maximilian was devoted to chamois hunting, and is reported to have once been led by the chase into an awkward situation. In 1492, Charles VIII. of France, feeling a desire to know what was at the top of a mountain with remarkably precipitous sides in Dauphine, commissioned Antoine de Ville, lord of Dompjulien and Beaupré, to find out. He accomplished the task satisfactorily, heard mass on the top, and duly made his report to the Parlement of Grenoble. Not very much later, Leonardo da Vinci was climbing and making scientific observations on a mountain which seems to have been Monte Rosa. But the first real literature of mountaincering, in which scientific research is blended with something like a love of the mountains for their own sake, comes from Zürich, from Conrad Gesner and Josias Simler in the 16th century, and Scheuchzer at the end

of the 17th century.

With the exception of the Roccia Melone, the first real snow-peak believed to have been ascended is the Titlis, near Engelberg, in canton Unterwalden, by a monk in 1739. In 1770 two brothers, De Luc, watchmakers of Geneva, ascended the Buet in Savoy. The Velan, a peak over 12,000 ft. high, near the Great St. Bernard, was climbed in 1779 by M. Murith, afterwards prior of that house. De Saussure, a scientific man of Geneva. a passionate lover of the mountains, had already offered a re-ward for the discovery of a route to the summit of Mont Blanc; but more than a quarter of a century elapsed before the reward was claimed. Finally, in June 1786, Jacques Balmat found practicable way; and on August 8 of the same year he reached the summit, taking with him the village doctor, Paccard. Next year he repeated the feat with two other guides, and a few days later led the huge cavalcade, seventeen guides and a servant, who accompanied Saussure on his classical ascent. Just a week after this, the first English ascent was made by Colonel Mark Beaufoy. Mr. Woodley followed in 1788. After that no further ascents were made for Turther ascents were made for fourteen years; and between Woodley in 1788 and Albert Smith in 1851, only thirty-one parties in all reached the top. The peaks about the sources of the Rhine were explored, and some of them ascended in the letter verse of the 18th entury latter years of the 18th century, by Placidus a Spescha, a monk of Disentis in Switzerland.

The example set in the W. Alps was duly followed in other districts. On July 28, 1800, the summit of the Gross-Glockner was reached by some peasants and a parish priest named Horrasch; and on the following day another party of peasants, accompanied by Valentine Stanig, a young mathematician, erected there an iron cross and a tall pole. In 1802, Cardinal Salm-Reifferscheid, who had initiated these attempts, reached the second peak of the mountain. This was speedily followed by the ascent of the Ortler-Spitze. The impulse to the attack on this

mountain was given by the Archduke John of Austria, who, in 1804, commissioned Dr. Gebhard to reconnoitre the mountain, and if possible reach the top. After one or two vain attempts by some men from the Zillerthal, Gebhard secured the services of Joseph Pichler, a hunter from the valley of Passeyr. On September 27, Pichler, with the Zillerthalers, were descried through a telescope on the summit. Their ascent had been made by a route now regarded as one of the most difficult and dangerous, and, considering the inadequate nature of their appliances, must be looked on as a remarkable feat of pluck and perseverance. Next year Dr. Gebhard himself reached

the same point.

During the first half of the 19th century Mont Blanc continued to be ascended; several of the peaks of Monte Rosa were attained, though not the actual highest; many of the Alps of Bern and Uri were climbed, notably the Finsteraarhorn, the Jungfrau, the Wetterhorn, and the Galenstock; while in the Austrian Alps an even more systematic campaign was carried on by Thurwieser, Ruthner, and The most consistent others. British devotee during those years was J. D. Forbes. From 1826, when he first visited Chamonix as a lad of sixteen, to 1850 there were few parts of the range into which he did not penetrate. In 1837 he made a tour through Salzburg and Tyrol, including the then almost unknown dolomitic region round the Mar-molata. In 1841 he began in Dauphine, thence making his way to the Bernese Oberland, where he ascended the Jungfrau, and finished at Zermatt. Lord Minto had been there, and had ascended the Breithorn in 1830, and Sir John Herschel even earlier. John Ball, the first president John Ball, the first president of the Alpine Club, was at Zermatt in 1845. Forbes's book, Travels through the Alps of Savoy, which appeared in 1843, was the first English book of any consequence dealing with the high Alps. But what above all attracted the attention of the English public to the new form of sport' was the ascent of Mont Blanc by Albert Smith, or rather the highly popular en-tertainment in which that ascent was described. By 1857 the number of those who sought the high Alps for recreation, most of whom. for some reason that has never been explained, were Cambridge men, had so much increased that it was possible to found the Alpine Club (1857). The influence of the club has been used as far as possible to discourage foolhardy adventures, and to inculcate the



Buckmerk and goggles.
 Cutting steps.
 Ice axes, lamp, and rope.
 The rope in use: fall through an ice bridge.
 Mummery pocket tent (supported by ice axes), cooking stove, and camera.
 Nearing the top.
 Water-bottle, binoculars, and climbing boots.

due observance of the rules which experience has shown to be essential to safety. It is noteworthy that not one of the original members of the club, and only one of those who were the leading guides at the date of its formation, lost his life in an accident above the snow-line. In 1859 was published, under the title of Peaks, Passes, and Glaciers, the first collected account of expeditions made by members of the club. Mr. Ball was the editor, and the book achieved a great success. A second series, in two volumes, followed three years later. On March 1, 1863, appeared the first number of the Alpine Journal; and besides these, Mr. Hinchcliff, Mr. (now Mr. Justice) Wills, Mr. Leslie Stephen, Professor Tyn-dall, Mr. Whymper, published books which are among the classics of the sport.

The Alps have not sufficed to exhaust the energies of mountaineers. So long ago as 1868 Mr. Douglas Freshfield and others visited the Caucasus, and climbed some of its principal peaks. Another party was there in 1874, and nearly all the great summits of that chain have now been con-quered. Mr. Whymper, Sir W. M. Conway, and Mr. Fitzgerald have similarly found routes to many of the highest peaks of the Andes. The summit of Kilima-Njaro, believed to be the most elevated point on the African continent, was reached by Dr. Hans Meyer and Herr Purtscheller in 1889; and ten years later Mr. Mackinder at-tained the somewhat lower but more imposing peak of Kenya, 200 m. farther N. The glaciers of New Zealand have attracted climbers from England as well as from the colony, and the Canadian Rockies are beginning to be a favourite resort. Even the tremendous altitudes of the Himalayas have been essayed; and though no peak of the first class has yet been attained, much has been added to our knowledge of the topography.

See C. E. Mathews's The Annals of Mont Blanc (1898); Whymper's Scrambles amongst the Alps in the Years 1860 to 1869 (1871) and Great Andes of the Equator (1892); Coolidge's Swiss Travel and Swiss Guidebooks (1889); Freshfield's Italian Alps (1875) and Exploration of the Caucasus (2nd ed. 1902); Specter and Smith's Through the High Pyrences (1898); Gilbert and Churchill's The Dolomite Mountains (1864); Conway's Climbing in the Himalayas (1847); Fitzgerald's New Zealand Alps (1896); Studer, Ueber Eis und Schnee (4 vols. 1869-83); Weihenmann, Aus der Firnenwelt; and Dr. Ruthner, Berg und Gletscher

Reisen in den österreichischen Hochalpen (1864-69); while a general survey of the conquest of the Austrian Alps is given in Die Erschliessung der Ostatpen (1893, etc.), ed. by Dr. E. Richter.

Mountains. In a typical mountain range certain features are always present. It consists not of a single ridge, but of a chain of elevations; and in the greater mountain systems many subordinate ranges may be present, running nearly parallel to one another, rarely branching or uniting, but as one dies out another rises and gradually assumes importance. The axial ridges are usually the highest; on each side of the range the mountains give place to lower elevations, often known as foot-hills, which in their turn merge into the surrounding plains. The higher peaks are mostly bare and rocky, often consisting mainly of sharp knife-edges, flanked by steep slopes. Around them lie the snowfields from which the glaciers take their rise. At lower elevations the rocks are covered

highly inclined, and when carefully examined are found to have been thrown into closely-packed folds. This structure is due to lateral compression, which has acted at right angles to the trend of the mountain axis. Effects of this pressure are also to be seen in the crushed and broken condition of the strata and the development of new minerals arranged in wavy bands, producing metamorphic schists and gneisses out of ordinary types of igneous and sedimentary rock. In many of the Alpine limestones the fossils are elongated, or con-torted and deformed, in such a way as to show that the hardest rocks have been kneaded like plastic substances under the enormous stresses which accompany the formation of a mountain sys-The folds into which the tem. rocks have been pressed are more open and gently curved in the outer parts of the ranges; towards the centre they become more closely compressed, and have their flanks highly inclined or vertical, dipping inwards and downwards, as it were, towards

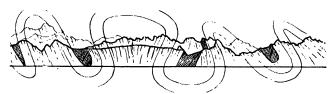


Fig. 1.—Diagrammatic section of Mt. St. Gothard and neighbourhood, showing fanlike stratu and original line of folding.

with a close growth of alpine plants and short grass. Still lower down the trees make their appearance, at first stunted and scattered, but soon in dense thickets. The glaciers flowing down the valleys usually reach the zone of forests before they melt away. Each altitude is marked by a characteristic climate and fauna and a distinctive type of agriculture.

type of agriculture.

The heights are separated by valleys. Between the main ridges the valleys are longitudinal or parallel to the axis of the range. Transverse valleys run nearly perpendicular to these, and are often of great importance as affording the easiest passes by which the mountains may be crossed. The principal rivers which drain a mountainous area are often not confined to one or other of these valley systems, but, after flowing for a time in a longitudinal valley, may suddenly enter a transverse depression, which again they may desert after a longer or shorter course. The rocks of which the greater mountain ranges consist are usually vertical, or at any rate

the roots of the mountains. On a grand scale they have the convergent arrangement seen in the ribs of an open fan. It is raie, however, to find it developed in perfect symmetry; very often one side is absent, owing either to a great dislocation lowering the folded beds out of view, or to the pressure under which the folding originated having been unilateral and not exerted equally from both sides. The process of mountain-building must in all cases have been very slow. Each system has had one great epoch of activity; but this has usually been preceded by minorepisodes of earth movement, and long ages after completion has apparently been attained earthquakes and volcanic activity may continue to affect the region.

The geographical features of a mountain range depend not only on its geological structure and the manner in which upheaval operated, but also, and probably to an equal extent, on the denudation to which it has been subsequently exposed. The sharp, serrated lines of peaks express vividly the gnawing action of

weathering, frost, and rain; the steeper slopes are often veiled by scores of loose stones, which show how potent are the agents of disintegration. The immense thicknesses of rock which have been swept away are indicated by the constant occurrence of the oldest geological strata in the central and highest mountains. These and nighest mountains. In case were once buried under great depths of younger formations, the broken edges of which may be found among the lower hills on each side. The rivers have on each side. The rivers have carved the valleys and passes, and in so doing have shaped the existing surface forms. The main transverse depressions may mark the earliest courses of the streams down the sides of the primitive ridges, while the greater longi-tudinal valleys are sometimes the natural divisions between the principal groups of folds. But the tendency of streams to follow the outcrops of the least resistant strata, and the power of the more actively eroding rivers to capture and divert the tributaries of those which deepen their channels more slowly, are factors which in time greatly modify the drainage systems, and obliterate or obscure their connection with the original folding. The age of a mountain chain must be less than that of the youngest beds which have been involved in the folding and upheaval. In this way we can tell that the Alps, Carpathians, Caucasus, Pyrenees, Hinalayas, and Rocky Mountains have received their principal uplift in Tertiary times, though it should not be forgotten that in some of them traces of still earlier epochs of earth movement are plainly visible. Geologists know that in the rocky strata of the earth's crust there are belts of intensely-folded rocks which are plainly the roots of older mountain chains, but very often they are represented on the surface only by ranges of low hills or by flat, eroded table-lands. Such are the Highlands of Scotland and of Scandinavia, a wide region in N. America around the reat lakes, the Ardennes, the Eifel, and the Bohemian uplands. These must at one time have been lofty mountains, but in the lapse of ages have been lowered by the Öther agencies of denudation. mountains have been elevated, not by processes of compression and folding like those described above, but by the rise of a block of the earth's crust, which is bounded on each side by parallel fissures. The Vosges and the fissures. Black Forest are of this nature; between them lies a sunken trough, in which the Rhine flows. It is rare to find this structure in such perfection, but not infrequently a mountain chain has on one side a long fault line along which the rocks of the plains have subsided. In the north of Italy a great fault has let down the plains of Lombardy. Very commonly the elevation of a mountain chain is attended by compensatory depression in some adjacent region. The Adriatic Sea, the Western Mediterranean, and the Vienna basin are concomitant phenomena to the upheaval of the Eastern Alps and the Carpathians. In the Rocky Mountains the earth's crust has not been greatly plicated, but has been thrown into long, gentle curves, which are often broken by faults. The fis-



Fig. 2.— Diagram showing structure of Vosges and Black Forest; raised parts bounded by parallel fissures.

sures separate great blocks of tilted strata, not crushed and recrystallized, like the rocks of the Alps, but preserving their original characters. Out of these the mountain forms have been moulded by running water and other croding agents. This is a remarkably simple type of mountain structure, but very interesting on account of the enormous scale on which it is exhibited.

Many of the most famous mountains are volcanic, and have been piled up by the accumulation of igneous rocks (lavas and beds of ashes) around an orifice or crater. They are consequently 'mountains' mountains are consequently in the co

grow on the mountains of Malaga. This wine is very similar to both Malaga and Tent wines.

Mount Barker, tn., co. Hindmarsh, S. Australia, 22 m. E. of Adelaide, at foot of Mount Barker. It has tanneries, but principally grows fruit. Pop. 2,000.

Mount Carmel, bor., Northumberland co., Pennsylvania, U.S.A., 45 m. N.E. of Harrisburg; has coal-mining. Pop. (1900) 13, 179.

Mount Clemens, health resort, Macomb co., Michigan, U.S.A., near the mouth of the Clinton R., 20 m. N.N.E. of Detroit; has mineral springs. Pop. (1900) 6,576.

Mount Desert, mountainous isl., Hancock co., Maine, U.S.A., 15 m. long and 8 m. broad, a favourite summer resort. Its highest point is Green Mt. (1,527 ft.). Shipbuilding and fishing are carried on. Bar Harbour, on the N.E. coast, is the most popular place. Pop. (1900) 7,989.

Mounted Infantry are troops

Mounted Infantry are troops intended to fight on foot as infantry, and mounted solely for the purpose of enabling them to murch more rapidly, farther, and with less fatigue than ordinary infantry can do. Mounted infantry is a most useful adjunct to cavalry, which it can support by supplying it with the fire-action and resisting power in which cavalry is weak. It is also eminently fitted for accompanying and supporting artillery. It is less fitted for reconnaissance and



Fig. 3.—Diagrammatic section showing structure of the Rocky Mountains; long curves broken by faults.

tains of accumulation,' and are not directly due to subterranean movements. Etna and the mountains of Iceland, the high Mexican peaks, Mount Shasta and others in the Rockies, Kilima-Njaro in Africa, and the lofty mountains of Java and Ecuador are examples.

See J. E. Marr's Scientific Study of Scenery (1900); James Geikie's Earth Sculpture (1900); Lord Avebury's Scenery of Switzerland (2nd ed. 1896); Sir A. Geikie's Scenery of Scotland (3rd ed. 1901); and text-books cited under GEOLOGY. The theoretical aspects of the subject are discussed in T. Mellard Reado's Origin of Mountain Ranges (1886) and Evolution of Earth Structure (1903), and in O. Fisher's Physics of the Earth's Crust (ed. 1889). Of special importance is Professor Suess's The Face of the Earth (trans. by Sollas, 1904).

las, 1904).

Mountain Wine, a sweet, luscious, white Spanish wine, made from fully-ripened grapes which

scouting than cavalry, and should not be thus employed except when cavalry is not forthcoming or cannot act. The dragoons raised in the 17th century were originally nothing else than mounted infantry. So late, however, as the 18th century we sometimes hear the army spoken of as 'horse, foot, and dragoons.' In the British army no permanent units of mounted infantry are organized or contemplated; the companies and battalions of mounted infantry are provisional, and are formed from selected detachments drawn from infantry units, and these detachments revert to their ordinary duties after a stage of training or after employment on active service.

The horse in the mounted infantry, not being intended to serve as a charger, but simply as a means of locomotion, should be of a different character from the ordinary troop-horse of cavalry. Wiry, short-legged cobs or ponies

are preferable, as being more enduring, and not requiring the same amount of care and high feeding. The men are taught riding sufficiently to serve for marching purposes; they retain their infantry arms. Machine-gun sections form part of corps of

Mounted Infantry Schools of Instruction have been established at Aldershot and Bulford, Salisbury Plain, in England, and at Kilworth in Ireland, while others are projected. The course of instruction extends from March to October each year.



The Mouse Family. The house mouse (brown, white, and pied varieties).
 Field mouse.
 Harvest mouse and nest.
 Barbary mouse.

mounted infantry, so as to increase the amount of mobile musketry fire. The normal proportion is a section of two machine-guns to every two companies. Britain is, up to the present time, the only country which contemplates the tactical use of mounted infantry in war. According to the new organization of the yeomanry, that force is to be composed entirely of mounted infantry.

Mount Gambier, tn., S. Aus-

Mount Lambler, th., S. Australia, 305 m. by rail s.E. of Adelaide. Pop. (1901) 8,000.

Mount Lofty, tn. and hill, co. Adelaide, 11 m. s.E. of the capital, S. Australia. Mount Lofty reaches 2,334 ft. It is a favourite resort. Pop (of dist), 5,000.

Mount mellick, mrkt. tn.

Mountmellick, mrkt. tn., Queen's Co., Ireland, 6 m. N. of Maryborough; has woollen manufactures. Pop. (1901) 2,407.

Mount Morgan, tn., Queensland, Australia, 28 m. s.s.w. of Rockhampton, with a famous gold mine. Pop. (1901) 9,609.

Mount-Stephen, GEORGE STEPHEN, LORD (1829). Canadian banker and railway constructor, was born at Dufftown, Banffshire, in Scotland. In 1850 he emi-grated to Montreal, where he be-came director and president of the Bank of Montreal. He was associated with his cousin, Lord Strathcona, in his various railway enterprises, and in 1879 was nominated first president of the St. Paul, Minneapolis, and Manitoba Railway. Chiefly through his energy, the contract for the construction of the Canadian Pacific Railway was laid before the Canadian House of Commons on Dec. 10, 1880. Five years later the railway was completed. Mount-Stephen became the president of the railway, and filled this position till 1888. Lord Mount - Stephen is one of the greatest philanthropists of modern times. He was created a baronet in 1886, and in 1891 he was raised to the per rage. He took his title from a peak of the Rocky Mountains named after him during the construction of the Canadian Pacific Railway.

the Canadian Pacific Kallway.

Mount Temple, Barron. See
COWPER-TEMPLE, W. F.

Mount Vernon. (1.) City,
Westchester co., New York,
U.S.A., 18 m. N. of New York.
Pop. (1900) 20,346. (2.) Town,
Jefferson co., Illinois, U.S.A.,
76 m. E.S.E. of St. Louis, in a coalmining district, with lumber trade. Pop. (1900) 5,216. (3.) mining district, with lumber trade. Pop. (1900) 5,216. (3,) Town, Posey co., Indiana, U.S.A., 18 m. s.w. of Evansville; has flour mills and lumber and engineering works. Pop. (1900) 5,132. (4.) Town, Knox co., Ohio, U.S.A., 40 m. N.E. of Columbus; has flour and saw mills, furniture factories and engineering

furniture factories, and engineering works. Pop. (1900) 6,633.

Mourne Mountains. See Down.

Mousa, isl. of Shetland group, Scotland. See Broch.

Mouscron, tn., prov. W. Flanders, Belgium, 7 m. s.s.w. of Courtrai. Cottons and woollens are manufactured, also chocolate, chicory, oil, and tobacco. Pop. (1900) 18,909.

Mouse, a name applied to the smaller members of the genus Mus, and by analogy also to various other small rodents similar in appearance or habits to the true mice. Rats and mice agree in possessing long scaly tails, in their long ears, the pointed and naked muzzle, and in having three longitudinal rows of tubercles on the molar teeth of the upper jaw. The difference between the two is largely arbitrary: the British mice and rats

are easily distinguished, but those of other countries pass into one another almost imperceptibly. The house-mouse (M. musculus) is now cosmopolitan, but was originally a native of Asia. It very large ears, its long tail, and the almost uniform brown coloration. Its natural food consists of grain and similar substances. Its movements are singularly active and graceful; like its allies it is remarkably prolific. We can here only name the field-mouse (M. sylvaticus), often confused with the vole, the tiny harvest-mouse (M. minutus), and the Barbary mouse (M. bar-In America are found barus). the white-footed mice, or vespermice, which belong to an entirely different genus. Care should be taken not to confuse the mice and their allies, which are rodents, with the shrews, which are insectivores.

Mouse-deer, a name sometimes given to the chevrotain.

Mousquetaires, French household troops of noble birth, originally formed (1622) by Louis XIII. They consisted of two companies, called the 'Gray' and the 'Black,' from the colour of their horses. Their most famous captain was Charles de Batz, Comte d'Artagnan (1621-72), a real personage, the hero of Les Trois Mousquetaires, by Dumas père. Suppressed (1791), and revived (1814), the Mousquetaires were finally disbanded in 1815.

Mouth, in comparative morphology. In all vertebrates, except in Amphioxus, tunicates, and cyclostomes, the mouth is bounded by jaws. Lips provided with muscles first definitely appear in mammals, where they are absent only in Monotremes, which do not suck, and have the jaws sheathed in horn. As regards the important organs of the mouth cavity, the teeth are considered in a separate article. The tongue is, as a rule, not well developed in fishes, and not being furnished with muscles, is capable of but little movement. In the higher amphibia and onwards the tongue is muscular, and usually very freely movable, though it is not well developed in birds. It reaches its highest degree of development in mammals. Glands appear in connection with the mouth from amphibia onwards. The digestive importance of their secretion reaches its maximum in mammals; but the poison glands of some reptiles should be noticed as a specialization of the mouth glands. In invertebrates the jaws of arthropods are in no way comparable to those of verte-brates; for the former are modifled appendages, and the latter modified gill-arches.

Movables. See HERITABLE AND MOVABLE.

Moville, tn., Co. Donegal, Ireland, w. of Lough Foyle entrance. 16 m. N.E. of Londonderry. It is a bathing resort, and the callingplace for transatlantic steamers following the northern track. Pop. (1901) 1,163.

Mowing Machines. See IM-PLEMENTS AND MACHINERY, AGRICULTURAL. Mowing machines for lawns consist essentially of a broad, horizontal 'ledger' blade, edged in front, and fixed more or less close to the ground. The grass is cut by the revolution of spirally arranged cutting-blades, which, on any forward movement of the machine, revolve close to the horizontal ledger blade. These blades are connected with a cog-wheel, which usually forms the termination of the spindle of the rollers at the back of the machine, and it is the movement of the rollers that causes the cutting-blades to revolve. Most machines are fitted with a grassbox in front, to catch the grass as cut. Cleanliness is of great importance in these machines.



The Motor applied to Lawn-mowing Machines (Shanks's Motor Mower).

Moyobamba, cap. of prov. of same name, dep. Loreto, Peru, 140 m. E. of Jaen; manufactures Panama hats. Pop. (1895) 10,000.

Mozambique. (1.) District of Portuguese E. Africa, is bounded on N. by the Rovuma R., and on the s. by Zambezia. From Cape Delgado to Angoche (Angosha) the coast offers numerous ports, such as Ibo, Pemba, and Mozambique; S. of Angoche it is very flat. Inland, the country, gradually rising, is covered with forest. Area, 100,000 sq. m. A road has been begun from the port to Lake Nyasa. (See Portuguese East AFRICA.) (2.) Capital of the above, a seaport on an island, in the entrance to Mossoril Bay. The town is unhealthy. Imports, 1904, £114,272; exports, £64,384. Principal exports, groundnuts, rubber, tobacco, calumba root, wax, and coffee. Pop. (1901) 5,500. (3.) M. CHANNEL, between Madagascar and E. Africa. It is 950 m. from N. to s., and though 600 m. wide at N. and S., it narrows between Mozambique and Cape St. Andrew to 250 m. The Comoro Is. lie in the N. entrance.

Mozarabes, Christian Spaniards who lived under Moorish rule in Spain. In spite of occasional outbursts of Mohammedan fanaticism, their condition was tolerable. They retained their tolerable. ancient Latin liturgy (Mozarabic rite), but their laxity was considerable, although in the earlier centuries they had their record of martyrdoms. They adopted Arabic in speech and writing, and wrote even Spanish in Arabic characters.

Mozart, Wolfgang Amadeus (1756-91), Austrian musical composer, was born at Salzburg. He received practically all his musical education from his father, Leopold Mozart, musical director to the archbishop of Salzburg, and author of one of the carliest methods for the violin. Besides the piano - which he began to study when little over three years of age - Mozart was taught the violin and organ, and almost from the first began to work at com-position. His sister, Maria Anna, five years older, was also a gifted pianist; and in 1762, after a gratifying reception at Munich and at the court of Vienna, the trio set out on a European tour, which lasted several years, Wolfgang playing the piano, violin, and organ, and everywhere creating a profound sensation. In Paris four of his sonatas for piano and violin were engraved, and before leaving London his father presented all Wolfgang's printed compositions to the British Museum, along with a motet which is his only work set to English words. For a considerable period subsequently, Mozart was taken on frequent tours throughout the Continent. Whilst in Rome in 1770 he visited the Sistine Chapel to hear Allegri's famous Miscrere composed for two choirs of nine voices-and after a single hearing performed the marvellous feat of writing the whole of this celebrated composition from memory. In the same year the Accademia Filarmonica, in Bologna, elected him one of its members—a much-coveted honour. Mozart's reputation as a composer and executant grew with his years; but his father's efforts to procure for him an appointment commensurate with his attainments were all in vain. In 1781 Mozart left home finally, and settled in Vienna; but his marriage in 1782 to Constanze Weber, a pianist and singer, increased the financial difficulties of his position, and also brought upon him the wrath of his father. After the conspicuous success of his opera Don Giovanni, to induce Mozart to remain in Vienna the Emperor Joseph II. appointed him Kammermusicus.

at a salary of about £80 a year. Though always in the grinding grip of poverty, Mozart was constantly composing, and even to within a few hours of his death was working at his unfinished Requiem. Mozart left over six hundred works. His system of instrumentation enabled him to secure a hitherto unapproached richness and variety of orchestral tone-colour. Of his forty-nine symphonies, the last three—in Eb, G minor, and C ('Jupiter')—are imperishable works of art; while, as an operatic composer, Mozart was, and in some respects is still, unrivalled. His most celebrated operas are Le Nozze di Figaro



Wolfgang Amadeus Mozart. (After the painting by Tischbein.)

(1786), Don Giovanni (1787), and Il Flauto Magico (1791). His other vocal compositions consist of masses, motets, choruses, duets, songs. His productions in the domain of chamber music -some for unusual combinations of instruments - also his concertos for piano and for violin, and sonatas for these instruments, still have a place in the repertoire of nearly all great performers. Mozart's powers as a creator of fresh, pure melody seemed inexhaustible; and supreme technical skill, clearness of expression in the working out of ideas, refinement and grace, are prominent characteristics in all his compositions. See Lives by Otto Jahn, which contains a summary of everything heretofore written on Mozart (4th ed. 1905, etc.; Eng. trans. 1882), Fischer (1888), Holmes (1878); Correspondence, edited by Nohl (1877); and the article in Grove's Dic-tionary of Music.

Mozdok, tn., Russian Cau-Vladikavkaz. In 1840 it was attacked by the Circassian chief Shamyl. Pop. (1897) 14,583. Mozir, or Mozuir, tn., Minsk gov., W. Russia, 145 m. s.s.e. of Minsk city, on r. bk. of Pripet. Its industries include tanneries, breweries, and oil works. Its churches include a Roman Catholic cathedral. Over one-fifth of the people are Jewish. Pop. (1897) 12,251.

Mozley, ANNE (1809-91), English author, was born at Gainsborough, Lincolnshire. Among her works were Passages from the Poets (1837), Days and Seasons 1845), and Poetry Past and Pressent (1849); and she edited the Letters of Cardinal Newman (1891) and the Letters of J. B. Mozley (1885). She died at Derby. See Memoir by Bishop Wordsworth, prefixed to her Essays from Blackwood (ed. 1892).

Mozley, JAMES BOWLING (1813-78), English theologian and writer, was born at Gainsborough. Lincolnshire. He took an active part in the Oxford movement, editing its organ, the Christian Remembrancer. After the Gor-ham decision, however, he practically withdrew from the movement. Mozley became vicar of Old Shoreham (1856), canon of Worcester (1869), and regius protessor of divinity at Oxford (1871). His chief works are The Augustinium Doctrine of Predestination (1855); The Primitive Doctrine of Baptismal Regeneration (1856); On Miracles (Bampton Lectures, 1865); University and other Sermons (1876); and Essays, Historical and Theological (1878). See Memoir by Dean Church, prefixed to Fearn fessor of divinity at Oxford (1871). Dean Church, prefixed to Essays (2nd ed. 1884).

M.P., Member of Parliament.
M.P.S., Member of Pharmacoutical Society; also, Member of Philosopical Society.
M.R., Master of the Rolls.

M.R.A.S., Member of Royal Asiatic Society; also, Momber of Royal Academy of Sciences.
M.R.C.C., Member of Royal College of Chemistry.

M.R.C.P., Member of Royal College of Physicians: (E.) of Edinburgh.

M.R.C.S., Member of Royal College of Surgeons; (E.) of Edinburgh.

M.R.C.V.S., Member of Royal College of Veterinary Surgeons. M.R.I.A., Member of Royal Irish Academy.

MS., manuscript; MSS., manuscripts.

M.S., Master in Surgery. Mtzensk, sometimes miswritten AMCHENSK, tn., Orel gov., Central Russia, 30 m. N.E. of Orel town. It has manufactures of tallow, candles, soap, and lace. Its cathedral has a miraculous image of St. Nicholas, and the spring at the foot of the hill is reputed to cure many diseases. Pop. (1897) 9,355.

Mtzkhet, ancient cap. of Georgia, Russian Transcaucasia, 13 m. N.W. of Tiflis, on the Kura. In the 5th century the capital was transferred to Tiflis. A fine cathedral (debased Byzantine cathedrai (decased Byzantine style) is the sole vestige of its ancient splendour. Mtzkhet still attracts pilgrims from all parts of the Caucasus. Pop. 767.

Muang-mai, Siam. See

CHIENG-MAI.

Muanza. (1.) District, German E. Africa, comprising the rich cattle country Usukuma and the barren Masai plains E. of Victoria Nyanza. Pop. over 300,000. (2.) Capital of district, on s. shore of Victoria Nyanza. Pop. 3,000.

Much Woolton. See Wool-

Mucilages, solutions of gum or glue in a fluid condition—gum arabic, dextrin (British gum), glue, gelatin, and gum tragacanth being the commonest ingredients employed. Gum arabic dissolves best in hot water; but genuine gum acacia should be used, as Bassora gum will not completely dissolve. To preserve a solution of this gum, the calcium salts inherently present in it should be precipitated by the addition of a few drops of sulphuric acid, and after straining a trace of an essential oil, such as oil of cloves, should be added. Dextrin forms the best solution when dissolved in cold water, and is the mucilage which is used for coating stamps. Glue and gelatin can only be kept in a fluid condition by the addition of glycerin, vinegar, or an acid, such as nitric. Casein from cheese or curdled milk, when dissolved in a concentrated solution of borax or ammonia, forms a strongly adhesive but thin mucilage that becomes waterproof on exposure to dry air. Paper labels that are to be affixed to tins require a special mucilage that will not only not cause the metal to rust, but will adhere to it well. Ordinary gum arabic mucilage will cause paper to adhere to glass and similar surfaces by adding to every 8% oz. or strong gum solution 30 grains aluminium sulphate, dissolved in loz. of water; or it may be prevented from drying hard and cracking by the addition of glycerin or sugar. Mucilages are employed in medicine for the suspension of insoluble drugs, gum acacia and tragacanth being used.

Mucin, a complex viscid substance found in the human body. It can be split up into a proteid and a carbohydrate (animal gum). It is most abundant in intercellular substance, but it is also found in the saliva, the gastric juice, bile, fæces, and urine. It seems to be the chief lubricant in the saliva, and perhaps acts in that way elsewhere. It is noticeable that normal gastric secretion does not digest cane sugar, but that large quantities of cane sugar in the stomach excite a production of mucus (mucin), and then the sugar is digested. Mucin in solution can be precipitated by acetic acid and by alcohol. It is soluble in weak alkaline solutions.

Muckers, a religious sect which originated at Königsberg in Prussia in 1835. The members belonged mainly to the aristocracy, and were led by two clerics, Ebel and Diestel, who held views similar to those of the English Agape.

monites or Princeites.

Mucoid, a substance resembling mucin in many ways, but differing from it in that, in whatever form, it is either not precipitated by acetic acid (which mucin is), or if precipitated is soluble in excess of the acid (which mucin is not). An example is ovo-mucoid, found in eggs.

Mucous Membrane. See Eri-

THELIUM.

Mud, the finest débris of rocks, produced by the decomposition or detrition of harder masses; when consolidated it forms 'mudstone,' 'clay,' or 'clay rock.' Some muds are dark from organic matter, others brown or yellow from oxide of iron. Green muds with glauconite, and blue muds with sulphide of iron, occur over proad areas of the sea bottom, at distances of 100 miles or more from the shores of the continents, Mud deposits are formed principally in sheltered estuaries, fresh-water lakes, deep quiet hollows surrounded by shallower water, and on the occan bed far away from land.

Mudar, a genus of Asiatic plants belonging to the order Asclepiadaceæ. The inspissated juice has purgative, emetic, and

sudorific properties.

Mud-fish. See BOWFIN.
Mudgee, tn., co. Wellington,
N.S.W., Australia, 153 m. by rail
w. of Sydney. It produces gold
and wed. Pap. (1901) 3,000

w. of Sydney. 16 produces and wool. Pop. (1901) 3.000.

Mudle, CHARLES EDWARD (1818-90), founder of Mudic's Library in London, was born at Chelsea; opened a circulating library in Southampton Row (1840-2), and moved to larger premises, New Oxford Street (1852). In 1864 the library became a limited company. In 1906 the advantages of the library wern made available through the railway bookstalls. A philanthropist and deeply religious, Mudie published Stray Leaves, a volume of hymns and verses.

Mudijares. See Moriscos. Mudki, vil., Punjah, India, 64 m. s.s.e. of Lahore, was the scene of the repulse of the Sikhs, in December 1845, by Sir Hugh Gough. Pop. (1901) 2,977. Mud Volcanoes are produced by the ascent of bubbles of gas through masses of liquid mud. Such mud volcanoes are found only in volcanic regions, such as the Yellowstone Park, U.S.A., and Now Zealand. In others, gases of the petroleum group are emitted, as in N. Italy, Baku on the Caspian, and in several parts of N. America.

parts of N. America.

Muchlenbeckia, a genus of shrubs and sub-shrubs belonging to the order Polygonaceae. The hardy New Zealand climbing plant, M. complexe, is the most useful species for garden cultivation. It is of graceful habit, and bears curiously fiddle-shaped leaves.

Muezzin, the official attached to a Mohammedan mosque, whose duty it is, from one of the lofty minarets, to summon the faithful to prayer. This he does five times daily—i.e. at dawn, noon, 4 p.m., sunset, and midnight. The traditional summons is as follows: 'God is great! [thrice]. There is no God but Allah [twice]. Mohammed is the prophet of God [twice]. Come ye to prayer. God is great [twice]. There is no God but Allah.'

Muft!, an expounder of the Mohammedan law, forming an important class of the Ulema, that great corporation of theologians and lawyers upon whose interpretations of the Koran the cadi, or judge, is supposed to depend for his decisions. The muftl's functions are a combination of those of public prosecutor, or advocate, and assessor. The grand mufti, or Sheik-ullslam, is head of the Ulema.

Muggleton, Lodowick (1609-98), English heresiarch, was born in Bishopsgate, London. Claiming to have a divine commission to declare a new faith, he founded the sect of the Muggletonians (1652). His system—formalized in a book called The Transcendent Spirituall Treatise (1652), and in subsequent works—is a curious medley of rationalism and literal adherence to Scripture: for example, it rejects alike prayer and the Copernican system of astronomy. Nevertheless, though often persecuted, Muggleton gained many converts. See his own Letters and Autobiography (to 1677), prefixed to his Acts of the Witnesses (1699).

Mugwort, a name sometimes applied to the common British herbaceous plant Artenisic vulgaris. It is a tall, somewhat slender, yet bushy plant, with silky stems and pinnatifid leaves, downy on their under surface, but green above. It bears panicles of greenish-yellow flowers in autumn. The plant is much liake wormwood in appearance, but is without aromatic odour.

Mugwumps, a torm employed to designate, during the presidential election of 1884 in the United States, the receding Republicans who voted for Cleveland, the Democratic candidate, because of his devotion to civil service reform. The term was afterwards applied to all who affected to be superior to party affiliations; but it subsequently fell into disuse.

Mühlberg, tn., Saxony, Prussia, on r. bk. of Elbe, 35 m. N.W. of Dresden, was the scene of the defeat of the Elector of Saxony by Charles V. on April 24, 1547.

Pop. (1900) 3,463.



Mugwort (Artemisia vulgaris).
1, Ray floret; 2, disc floret.

Muhlenberg, John Peter Garrier (1746-1807), American general and politician, was born at Trappe, Pennsylvania, the son of a leading pastor in the American Lutheran Church. On the outbreak of the war of independence he abandoned the clerical profession, and organized the German regiment, which did signal service. He was present at Charleston, Brandywine, Yorktown, and many other actions, and rose to the rank of majorgeneral. See Life by H. A. Muhlenberg (1849).

Mühlhausen, tn., Prusslan Saxony, on the Unstrut. 25 m. by rail N.N.W. of Gotha. It trades in linen and cotton goods, cycles, sewing and knitting machines, leather, chemicals, beer, and malt. Mühlhausen was an important commercial centre at

the beginning of the 14th century, being on the main route from Hamburg and Bremen to Nuremberg and Augsburg. During the Peasants' war it was the headquarters of Thomas Münzer in 1525. Pop. (1900) 33, 428.

Muir, John (1810-82), Scottish Sanskrit scholar, was born at Glasgow. He entered the service of the East India Company (1829), but became principal of Queen's College, Benares (1844), and in 1845 judge at Fatehpur. He retired in 1853, and at Edinburgh founded the chair of Sanskrit and the lectureship in comparative philology (1862). He published Original Sanskrit Texts on the Origin and History of the People of India (1858-70), and other works dealing with Indian history, Christian apologetics, and biography.

Muir, Sir William (1819-1905), brother of John Muir (1810-82), was born in Glasgow. He entered the Bengal Civil Service in 1837. After holding various offices, in 1868 he was appointed lieutenant-governor of the North-West Provinces; in 1874 financial minister for India, and in 1876 a Member of Council for India. From 1885 to 1902 he was principal and vice-chancellor of Edinburgh University. He was knighted in 1867. He wrote Life of Mahomet (1888), The Caliphate (1891), The Maneluke Dynasty (1896), The Coran (1877), and The Mohammedan Controversy (1897).

Muirburn, the statutory offence in Scotland of setting fire to any heath or muir between April 11 and November 1 (13 Geo. III. c. 54). It is punishable by a fine of 40s. for a first offence, £5 for the second, and £10 for subsequent offences, with imprisonment from ten days to three menths in default of payment. At other times of the year muirburning is lawful and beneficial, but a landowner or tenant who negligently allows the fire to extend to neighbouring property is held liable for damage done.

Muirkirk, tn., Ayrshire, Scotland, 24 m. s.g. of Kilmarnock, has iron works. There is a Baird Institute. Pop. (1901) 5,670.

Mukden (Chinese Shênyang), cap. of Shöng-king, the s. prov. of Manchuria, 100 m. N.E. of New-chwang, and 6 m. E. of its railway station. It is enclosed by a lofty crenellated brick wall from 13 to 14 m. in circuit. The city resembles Peking on a small scale. It superseded Liao-yang as the capital in 1625. The present wall and the imperial palace in the centre of the city were built in 1631. The tombs of the ancestors of the present Manchu dynasty of Chinalie N. and E. of the city, and are

amongst the most picturesque spots in the vicinity. During the Boxer rising in 1900 the city was much injured by fire. Inside the E. gate is the 'Fox' temple, much frequented by those who seek to have their diseases miraculously cured. After a fiercely-contested battle of fourteen days' duration, the Russians were here defeated by the Japanese, who entered the city on March 10, 1905. Mukden has an arsenal and a mint, and outside its walls four conspicuous Lamaist monasteries, and is an important commercial centre, especially for furs. It is now open to foreign trade. The Roman Catholics and the Scottish and Irish Presbyterians carry on mission work. Pop. (1905) 180,000. See K. von Donat's The Battle of Mukden (Eng. trans.

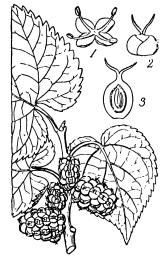
Mukhtar Pacha, GHAZI AHMED (1832), Turkish general, born at Brusa, Asia Minor; decorated for bravery in Montenegro (1860); became governor of Yemen in Arabia (1871); defended Armenia, especially Kars, against the Russians (1877); and put down (1878) the Cretan rising. Sent as high commissioner to Egypt (1885), he became the determined enemy of the British occupation.

Mula, tn., Murcia prov., Spain, 18 m. w.N.w. of Murcia, with sul phur baths. Pop. (1900) 12,731. Mulatto. The true mulatto,

who is usually sprung of a white father and black mother, invariably retains more of the dark than of the light element-dirty yellowish complexion, grizzly or woolly black hair (never straight or brown), small nose, rather flat and broad features. In the W. Indies and Latin America the various shades of hybridism are distinguished by special names. Thus creole is a white in Spanish America, a black in Brazil, a white and mestizo cross in Peru; zambo (sambo), generally a negro and mulatto cross, is a Carib half-caste in St. Vincent; pardo, a mulatto in Brazil, is any halfbreed in Argentina. But quadroon (quarteroon), quinteroon, and octoroon have everywhere the same meaning-white with onefourth, one-eighth, and one-six-teenth black blood respectively.

Mulberry, the popular name of two trees, Morus nigra and M. alba, the leaves of which are the food of the silkworm. M. nigra is also valued for its fruit. It was introduced into England about the middle of the 16th century, and it is found to be quite hardy in the south. In the north it requires the protection of a wall. When ripe, the fruits are very juicy, and have a characteristic arona and a sub-acid flavour. The mulberry tree thrives in any ordinary garden soil if it be well

drained. Planting is best done in November or the end of October. Dr. Bartrum advises that in planting young trees only four branches be lett, and that these be cut hard back to three or four inches and to an outer eye. These will probably throw out strong shoots. The tree bears on short-jointed young wood, and on spurs, not on gross shoots.

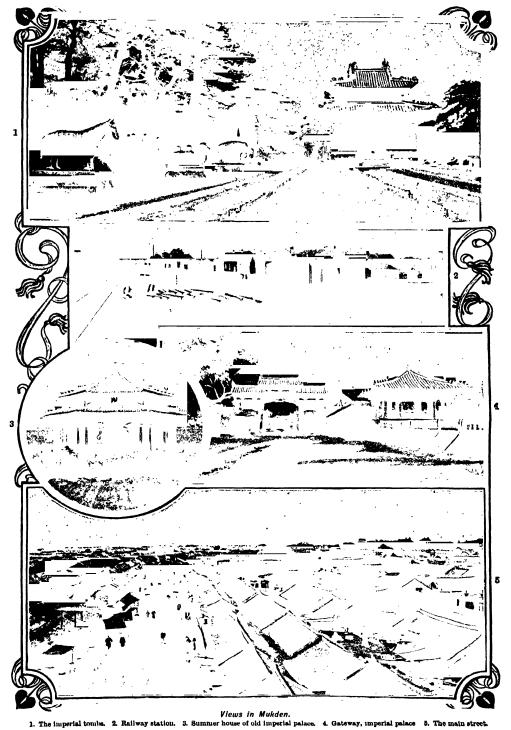


Mulberry (Morus nigra).

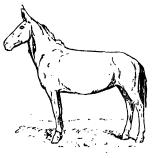
1, Stamen, flower; 2, pistil, flower; 3, section of single fruit.

Mulcaster, Richard (?1530-1611), English philologist, is said to have been a native of Carlisle. He is chiefly known as headmaster of Merchant Taylors' School (1561-86), and high-master of St. Paul's School (1596-1608). He was severe in discipline, but was in many ways in advance of his time; taught boys music, singing, and acting; insisted on the importance of physical training; and advocated the higher educa-He became vicar tion of girls. of Cranbrook (1590), prebendary of Gatesbury, Sarum (1594), and rector of Stanford Rivers (1598). He wrote several educational books, the chief of which is Po-sitions (1581). See Memoir by R. B. Quick, prefixed to Positions (1888); lecture by Fostor Watson, in Educational Times (Jan. 1, 1893).

Mulching is the process of applying leaves, straw, cocoanut fibre, ashes, manure, or other substance to the surface of the soil above the roots of plants, in order to keep the soil moist by checking evaporation, to protect the roots from the effects of frost in winter, to keep the surface of the soil loose, or to add to the soil some form of nourishment.



Mule, the offspring of the mare and the male ass, though it is quite justifiable to apply the term to any hybrid. The fact that mules are apparently absolutely sterile inter se is largely responsible for the belief, so firmly fixed until Darwin's time, that hybrids are always infertile. (See HYBRID.) Though the evidence is perhaps not absolutely reliable, there is some reason to believe that the female mule may prove fertile occasionally when crossed by a stallion or a male ass. It is at least certain that the females occasionally secrete milk, and may entice foals away from their mothers, showing the presence of the maternal instinct. In the East mules are very highly valued, and have been bred for centuries. They are also bred to a large extent in some parts of America and in Spain. qualities which make them valuable are due to blended inheritance: thus they are stronger in constitution than the horse, less liable to disease, and more easily



Mule.

pleased in regard to food, while superior in muscular strength and in bulk to the ass. Like the ass, they are obstinate in disposition, but display wonderful sagacity, and are marvellously sure-footed. The mule may attain a height of sixteen hands. The general shape of the head, the long ears, the short hairs of the upper part of the tail, the low croup, and the small hoofs recall the ass.

Mules in the Army.—At three years old the mule is more subject to sickness than at any other age, and no mule should be purchased for the army until he is four years of age, when his tail has attained its full length and the tushes begin to appear in the mouth of the male. He is at his full strength at eight years old; at twelve he begins to slacken in power, but can do hard work until fourteen or fifteen. If treated with patience and gentleness, he can be broken in ten days. Entire mules are vicious

and troublesome, but are better, on the whole, than geldings, as these easily tire. Marcs are best, as being more docile. Mules are easily scared by noises and sights to which they are unaccustomed. They are particularly useful as pack animals, but can also be used in harness for draught. A fair load for an average pack-mule is about 200 lbs., including the weight of the pack-saddle, which varies from 20 to 40 lbs. Mules walk at about three miles an hour, but can be driven in harness at a trot. They are well adapted for military purposes in mountainous countries and where roads are bad, being very surefooted and easy to feed.

Mulgrave, Earl of.

Mulgrave, Earl of. See Sheffield.

Mulhall, Michael George (1836–1900), British statistician, was born at Dublin. He went to S. America, and founded there the first English daily-paper (the Buenos Ayres Standard, 1861), and wrote the first English book printed in Argentina (Handbook of the River Plate, 1869). Mulhall's chief work was the compilation of statistics e.g. Progress of the World in the 19th Century (1880); The Balance-Sheet of the World, 1870–80 (1881); Dictionary of Statistics (1883, 1886, 1892, 1899); Fifty Years of National Progress (1887); Industries and Wealth of Nations (1896); and National Progress in the Queen's Reign (1897).

Mülhausen, tn., Alsace-Lorraine, Germany, 21 m. by rail N.W. of Basel, on the III, a tributary of the Rhine. Rhone canal; is a most important manufacturing centre (principally cotton goods and chemicals). The Workmen's Town, a labour colony, founded in 1833 by Jean Dollfuss, lies N.W. of the old town. Machinery and railway materials are also made. For eighty-three years Mülhausen belonged to France, but became German in 1871. Pop. (1900) 89,118.

Mülhelm. (1.) ON THE RHINE, tn., Rhine prov., Prussia, 3 m. N.E. of Cologne; has chemical and engineering works, and manufactures silks, satins, and plush. Pop. (1905) 50,807. (2.) ON THE RUHR, tn., Rhine prov., Prussia, 16 m. N. of Düsseldorf; has iron works, engineering shops, and glass works. A large coal trade is carried on. Pop. (1905) 93,598,

no m. N. of Dusseldorr; nas from works, engineering shops, and glass works. A large coal trade is carried on. Pop. (1905) 93,598, Mull, isl., Argyllshire, Scotland, 7 m. w. of Oban, with an area of 224,802 acres, length 30 m., breadth 29 m. The loftiest summit is Benmore (3,185 ft.). Large tracts are grazed. Tobermory is the chief town. Pop. (1901) 4,334.

Mullah, or MOLLAH, a Mohammedan judge or magistrate. In Turkey the title is given to the Sultan; in Egypt and India, to the founder of any sect or the leader of any movement, religious or otherwise. In recent years the mullahs who have stirred to revolt the fanaticism of the tribes of N. India and Somaliland have been described as 'mad'—i.e., 'inspired' or 'burning with devotion.'

Mullein, the popular name of various species of the plant genus Verbascum, a subdivision of the order Scrophulariaceæ. They have a five-partite calyx, a five-cleft irregular corolla, and five hairy stamens. The great mullein (V. Thapsus) is a com-The great mon roadside plant in Britain, where its height (often five feet or more), its woolly, flannel-like leaves, and its dense spikes of vellow flowers make it conspicuous in late summer. Other less common British species are V. nigrum, the black mullein, more slender and of darker colour than the last-named, bearing in autumn spikes of yellow flowers, the stamens of which are covered with purple hairs; and the moth mullein (V. Blattaria), which is mostly found in the western counties of England.

Müllenhoff, Karl Viktor (1818-84), German philologist, was born at Marne (Holstein). He was made professor of German language and literature, first at Kiel (1846), then at Berlin (1864), where he died. His chief works are Deutsche Altertumskinde (4 vols. 1870-91; 2nd ed. 1906, etc.), Denkmüler ans dem 8 bis 12 Jahrhundert (1864), and books on the philology and antiquities of medieval Germany. See Life, in German, by W. Scherer (1895).

Müller, BARON FERDINAND VON (1825 96), botanist and explorer, was born at Rostock, and went to Australia, where he travelled in S. Australia (1848-52), and accompanied Gregory to N. Australia (1856). He was appointed gov-Victoria ernment botanist for (1852), and director of the botanic gardens, Melbourne (1857-73). He was an able descriptive botanist; but his chief service to mankind was the introduction of the blue gum (Eucalyptus globosus) into various parts of the world. Amongst his works are Flora Australiana (7 vols. 1863-70), in collaboration with Bentham; Plants of Victoria (2 vols. 1860-5); and Eucalyptographia (1877-82).

Müller, FRIEDRICH MAX. See MAX-MÜLLER.

Müller, GEORGE (1805-98), German philanthropist, was born at Kroppenstadt, near Halberstadt, and came to England (1828). While (1829) at Teignmouth he took up 'faith' principles, and henceforth he literally took 'no

thought for the morrow,' believing that all that was needed would be divinely supplied. At Bristol (1832) he instituted several philanthropic works, the best known of which is the orphanage at Ashleydown (1836). In 1875, when he started on a great missionary tour, it sheltered 2,000 orphans. Müller wrote A Narrative of Some of the Lord's Dealings with George Müller (5 vols. 1837-85). See his Autobiography (new ed. 1905) and George Müller of Bristol, by Pierson and Wright (6th ed. 1902).

Müller, Johann. See Regio-

MONTANUS.

Müller, Johannes (1801–58), German physiologist, was born at Kohlenz; appointed (1826) professor of anatomy and physiology at Bonn, and at Berlin (1833). He made researches with regard to the mechanism of speech, sight, and hearing, and the properties of lymph, chyle, and blood, and did valuable work in embryology and morphology; but his chief service was the systematic arrangement of physiological knowledge in the Handbook of Human Physiology (1833–40; Eng. trans. 1840–9).

Müller, Johannes von (1752-1809), Swiss historian, was born at Schaffhausen, where he was appointed professor of Greek in 1772. From 1774 to 1780 he taught history at Geneva. He established his reputation by the publication of his Geschichte Schweizerischer Eidgenossenschaft (1786 -1805; better ed. 1826). In 1786-92 he was librarian at Mainz, in 1793-1804 at Vienna, and in 1804 went to Berlin, where he became historiographer-royal. In 1806 he was given an important appoint-ment in the government of West-phalia by Napoleon. Müller's other principal works are Ueber die Geschichte Friedrichs des Grossen (1807), The Journeys of the Popes (Eng. trans. 1852), Universal History (Eng. trans. 1818). His Sümmtliche Werke 1818). His Sämmtliche appeared in 40 vols. (1831-5). See Lives, in German, by Döring (1835) and Thiersch (1881).

Müller, Julius (1801–1878), German theologian, was born at Brieg. He was a profossor successively at Göttingen (1834), Marburg (1835), and Halle (1839), where he died. His greatest work is Die Christliche Lehre von der Sünde (1839; Eng. trans. The Christian Doctrine of Sin, 1868), the most memorable tenet of which is perhaps the theory of the pre-existence of souls, advanced as an explanation of original sin. He also wrote Das Verhältniss der dog. Theologie zu den antireligiösen Richtungen der Zeit (1843), and Doymatische Abhandlungen (1870). See Lives, in German, by

Kähler (1878) and L. Schultze

Müller, KARL OTFRIED (1797-1840), German classical archæologist, was born at Brieg in Silesia, became professor of archeology at Göttingen (1819). He is a fruitful pioneer of comparative mythology, publishing System of Mythology (1825; Eng. trans. 1844). He died at Athens while making excavations at Delphi. Some of his other works were also epoch-making in the study of antiquity—e.g.Geschichte hellenischer Stämme und Stätte (new ed. 1844), the second and third volumes of which were translated into English as History and Antiquities of the Doric Race (1830); Ancient Art and its Remains (1835; Eng. trans. 1847); The Etruscans (1828; Eng. trans. 1843); and A History of the Literature of Ancient Greece (3 vols. 1858). See *Life*, in German, by F. Ranke (1870).

Müller, Willielm (1791-1827), German lyric poet, was born at Dessau; became a teacher at the Dessau gymnasium (1819), and librarian of the ducal library. His principal books were Lieder der Griechen (ed. 1844), Neugriechische Volkslieder (1825), Lyrische Reisen (1827). Some of his poems, set to music by Schubert, tave almost become national songs—e.g. Die Schöne Müllerin and Winterreise. See new edition of his Gedichte, by his son, Prof. Max-Müller (1868). His Diary and Letters were published by P. S. Allen and Hatfield in 1903.

Müller, WILLIAM JOHN (1812
45), English landscape painter, was born at Bristol. Left-handed, an indefatigable worker, his broad, direct style found scant favour from the Royal Academy, where he first exhibited in 1833. His love for the East led him to accompany Sir Charles Fellowes to Lycia (1841). An excellent draughtsman, his feeling for colour developed during his so-journs in the East, and his Oriental pictures are of fine quality. He died of overwork and dejection at lack of sympathy. His work is well represented in the Tate Gallery, London. See Memoir, by N. Neal Solly (1875); and 'W. Müller and his Sketches,' by F. Wedmore, in Portfolio (1882).

Mullet. See HERALDRY.
Mullet, two distinct families
of fish. (1.) The red mullet (Mullus barbatus) belongs to the
Mullidæ, and extends from the
Canary Isles to Norway, including the Mediterranean; rare on
the British coasts, except the
south and west. It is much
esteemed for its flavour, especially on the Continent. Among
the Romans it was valued more
than any other fish, almost
fabulous sums being paid for

large specimens. It was brought alive into the banqueting-room and allowed to expire in the hands of the guests, the red colour then appearing in all its brilliancy. The same object is now attained by scaling the fish when it is caught. (2.) The gray mullet is a member of the family Mugilidæ, which are found both in temperate and tropical seas. They typically inhabit brackish water, and have the food canal curiously modified to enable them to extract the organic substances from the sand and mud on which they feed. Apparently they live chiefly on vegetable matter. The body is more or less elongated and compressed, and is covered with smooth scales of moderate size. Of the two dorsal fins, the anterior is composed of four stiff spines. The tail fin is large and somewhat forked; there are no barbels, and the teeth are feeble or absent. An example is the thicklipped gray mullet (Mugil chelo). All the members of the family are edible.

Mullingar, co. tn., Westmeath, Ireland, 39 m. w.n.w. of Dublin, on Royal Canal. It has a Roman Catholic cathedral and college.

Pop. (1901) 4,504.

Mullion, the vertical bar employed in Pointed architecture to divide the window into two or more lights. In the later periods the window-head is subdivided by a series of minor mullions springing from the point of the arch. The original bar cuts through the transom and terminates in the window-head.

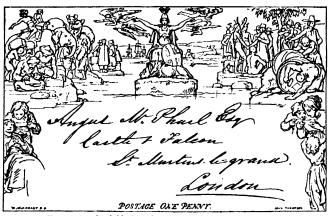
Mulready, WILLIAM (1786-1863), Fish genre painter, was born at Ennis, Co. Clare. His earliest exhibited works were landscapes (1804 6); but in 1807 and 1808 appeared his subject pictures, Old Kaspar and The Rattle, both showing the influence of Dutch art, as did also his first important picture, The Carpenter's Shop and Kitchen. His Idle Boys immediately preceded his election as A.R.A. in 1815; and he received full honours early in 1816, before his famous Fight Interrupted was exhibited. After 1827 his work showed masterly execution, splendour of colouring, delicate technique, and perfection of drawing; and fine examples of this later period are The Sonnet (1839), Choosing the Wedding Gown (1846), The Seven Ages (1838), all in the S. Kensington Museum. He also executed a fine series of life studies, and as a teacher he was especially successful. He designed the first penny postage envelope, issued by Rowland Hill (1840), and illustrated The Vicar of Wakefield (1853). See Memorials of Mulready, by F. G. Stephens (1890); and 'William Mulready,' by F. G. Stephens, in Portfolio (1887).

Multan, or MOOLTAN, munic. city and cantonment (14 m. to the E.), Multan dist., Punjab, India, 7 m. from l. bk. of Chenab, and 190 m. w.s.w. of Lahore. The city is walled on three sides, and open towards the south. It has numerous ruins of mosques, tombs, and shrines, the most important being the tomb of Ruknialam, in the old fort. The chief manufactures are silks, cottons, shawls, and carpets. The city fell into British hands during the second Sikh war January 1849). Pop. (1901) 87,394. The district has an area of 6,079 sq. m. Pop. (1901) 710,626.

Multiplepoinding, a process of Scots law, similar to, but wider than, the English interpleader, by which it is determined which of two or more persons is entitled to property (which is generally a fund, but may be of any charSimilar quaternary systems are met with in ν Scorpii and 86 Virginis. The trapezium at the core of the great nebula in Orion is sextuple, being composed of four bright stars, two having faint and probably variable satellites. A double-quadruple construction is apparently exhibited by σ Orionis; and 45 Leporis consists of five principal and four subordinate members. With increasing complexity, multiple stars merge into clusters.

Mum, a fermented malt liquor prepared from wheat. The grist, previous to mashing, is mixed with oat and pulse meal. Two strengths of this peculiar beer are decocted; both are dark in colour and sweetish in flavour. Mum is a Brunswick production.

Mummius, whose full name was Lucius Mummius Achaicus (the last name being given to him because of his conquest of Greece in 146 B.C.), was prætor at



Example of a 'Mulready Envelope,' reduced in scate.

acter, heritable or movable), or in what proportions it is to be divided. When the holder of the fund (which is called the fund in medio) raises the action, he is called the real raiser; and when it is raised in his name, he is called the nominal raiser, and the claimant the real raiser. The action is much used by trustees for the purpose of obtaining exoneration, or of getting a judicial decision as to the meaning or effect of a trust instrument.

Multiple Stars, groups of three or more stars physically connected. Ternary systems are usually composed either of a closely double primary with a single, comparatively remote satellite, or of a single primary with a duplex attendant. Herschel perceived & Lyra to be made up of two couples, and each has proved to be revolving, while they drift together through space.

Rome in 154, and afterwards governor in Further Spain. In 146 he utterly defeated the army of the Ackenn league at the isthmus of Corinth, and plundered Corinth. He was center in 142 B.C.

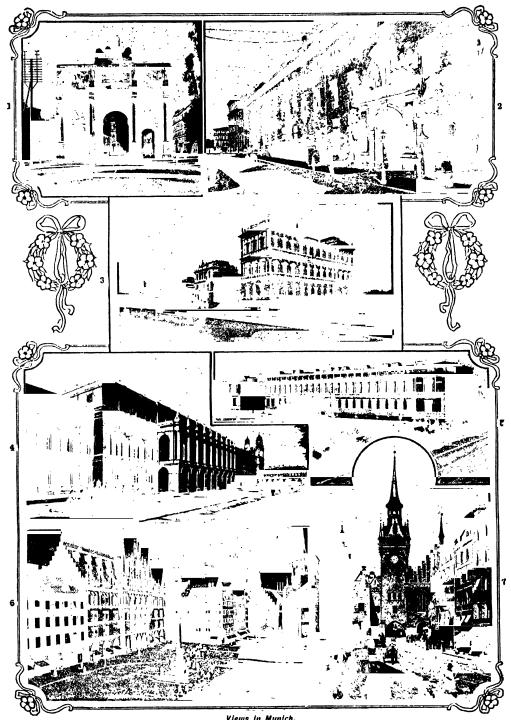
Mumps, or EPIDEMIC PAROTITIS, a highly contagious but not very serious epidemic disease, chiefly noticeable for the accompanying severe inflammation and enlargement about the parotid glands. It occurs most commonly among children, but any one may be infected. Mumps may develop any time between three and twenty-five days after infection, but usually show themselves from seventeen to twenty-one days after. Usually there is first a rise of temperature of one or two degrees, with slight headache and general discomfort. Stiffness is felt below the ear, generally on one side only, at first

on moving the jaw, and a swelling can be felt. About the third or fourth day is usually the worst, and by that time both sides of the neck are affected, the swelling being very marked, and great pain and difficulty are felt on any attempt to move the head or to swallow. There is little or no redness over the inflamed parts, the temperature generally falls as the swelling develops, and the swelling also goes in from seven to fourteen days after it begins. Inflammation of testicles or ovaries is not uncommon, and incurable deafness sometimes follows mumps, the cause not being certain. The patient should keep to bed during fever, and must not leave the house while there is any swelling. Hot fomenta-tions, or applications of opium and belladonna liniment to the swelling, give great comfort. A good purge is useful at the be-ginning. The risk of contagion is great until at least a week after all swelling has disappeared. The sufferer must therefore be isolated, and those who nurse the child must disinfect themselves and change their clothing before going among other children.

Mūn, ADRIEN ALBERT MARIE, COMTE DE (1841), French politician, was born at Lumigny (Seinc-et-Marne); entered the army (1862); served in Algeria; took part in the fighting round Metz (1870), and was made prisoner, but subsequently fought against the commune. He has been a member of the Chamber of Deputies since 1876, and has taken an active part in the foundation of the Corcles Catholiques d'Ouvriers. He was elected a member of the Academy (1897). His speeches and essays on social, political, and religious matters have been collected in 8 vols.

Munch, Andreas (1811-84), Norwegian author, born at Christiania; published his first collection of poems, Ephemerer, in 1836; from 1841 to 1846 was editor of the conservative journal Den Constitutionelle. He also wrote Digte (1848), Fra Nord og Syd (1848), Nye Digte (1860), Sorg og Tröst (1852), and Nyeste Digte (1861). In 1850 he became amanuensis at the university library, and within the next five years wrote three dramas (including Lord William Russell) and a fresh volume of poems. In 1866 he became professor at the university. He was a successful translator of Tennyson and Scott. His collected Verker were edited by Monrad and Lassen in 5 vols. (1887-90).

Munch, PETER ANDREAS (1810-63), Norwegian author, born at Christiania, where in 1841 he was appointed professor of history, and in 1861 keeper of the Record Office. He was a recognized



Views in Munich.

1. Siegesthor. 2. Old Palace. 3. Art Academy. 4. New Palace. 5. Old Picture Gallery. 6. New Rathaus. 7. Old Rathaus.

authority on Scandinavian archaeology and philology. His Historisk Beskrivelse over Kon-His griyet Norge i Middelalderen (1849) is one of the best books on medieval Norwegian history. His magnum opus, however, is Det Norske Folks Historie (8 vols. 1851-63), which carries the history of the country down to 1397. A selection from his essays and dissertations was published by G. Storm (4 vols. 1873-7).

München-Gladbach. See

GLADBACH.

Münchhausen. KARL FRIE-DRICH HIERONYMUS, BARON (1720 -97), narrator of marvellous stories, was born at Bodenwerder in Hanover. He served in the Russian campaign against the (1740 1). In 1785 a little book of forty-eight pages was published in London, entitled Baron Münchhausen's Narrative of his Marrellous Travels and Campaigns in Russia. This book was translated into German and issued (1786; new ed. 1896) with a preface by Bürger, who was supposed to be the author, till the editor, Karl von Reinhardt, declared that it was written by an author and professor named Raspe. The book was afterwards greatly enlarged by the addition of stories borrowed from various sources—e.g. Bebel's Facctia (1508) and Lange's Delicia Academica (1765).

Muncle, city, Indiana, U.S.A., co. seat of Delaware co., 47 m. E.N.E. of Indianapolis. It manufactures iron and steel. Pop. (1900) 20,942.

Munday, Anthony (1553 1633), English dramatist and miscellaneous writer, was born in London. In 1578 he went to Rome, probably as a spy on the English Jesuit College, and on his return wrote anti-Catholic pamphlets, translated romances, arranged city pageants, and revised Stowe's Survey of London His highest level was (1618).reached in the lyrics contribreached in the 17fls contributed, under the pen-name of 'Shepherd Tony,' to England's Helicon (1600). His plays included Death of Robert, Earl of Huntingdon (produced 1600); Departual of Balant England Downfall of Robert, Earl of Huntingdon (produced 1599); The Two Italian Gentlemen (date uncertain); and Sir John Oldcastle, written with Drayton and others (1600).

Mundella, ANTHONY JOHN (1825-97), English social and political reformer, was born at Leicester, the son of an Italian political refugee. A hosiery manufacturer of Nottingham, he was founder (1859) of the Nottingham Board of Conciliation in the clothing and hosiery trades. He sat in Parliament as member for Sheffield from 1868 till his death.

as an advanced Radical. In Gladstone's government (1880-5) he was appointed vice-president of the Committee of Council on Education, he having had a large share in the passing of Forster's Act of 1870. It was by his Act of 1881 that compulsory attendance at school was made universal in England and Wales. In Gladstone's short government (February-July 1886) Mundella was made President of the Board of Trade, with cabinet rank; and he resumed this office in the Gladstone - Rosebery administration (1892-5). He did much to bring to an end the great coal strike of 1893, and made an honest effort to pass a bill for setting up arbitration and conciliation boards. He resigned the presidency of the Board of Trade in May 1894, owing to the strictures of Mr. Justice Vaughan Williams on the New Zealand Loan Company, of which Mr. Mundella was a director. Mundella was chairman of the textile section of the Labour Commission (1891) and of the Departmental Committee on Poor-law Schools (1894-5). Generally he did a Generally he did a good deal to improve the conditions of labour.

Münden, tn., Hanover prov., Prussia, at confluence of Fulda and Werra (Weser), 15 m. s.w. of Göttingen; has chemical works and cigar factories, and timber trade. Pop. (1900) 9,236.

Munden, Joseph Shepherd (1758-1832), English actor, was born in Holborn, London. He made his mark at Canterbury (1780) as Faddle in The Oaks, and eventually became a leading comedian. He came to London (1790), and acted at Covent Garden and Drury Lane. Among his parts were Dogberry, Tony Lumpkin, and Sir Peter Teazle. See Memoir by his son (1811).

Mundrucus, South American aborigines, the most numerous and powerful of all the Amazonian peoples, whose territory extends along the right (south) bank of the Amazons, between the Abacaxis and Tapajos, and up the latter river. They are a fierce, warlike nation, who kill and eat their aged and infirm relatives. The Mundrucus, who number collectively from 35,000 to 40,000 souls, speak a language showing strong Tupi affinities, and are regarded by most authorities as members of the Tupi-Guarani

Mungo. See Woollen Tex-TILES.

Mungo, St. See Kentigern. Mungoose. See Mongoose. Munich (Ger. München), tn., cap, of kingdom of Bavaria, on river Isar. Of the nine bridges which span the river, the Cor-

nelius bridge was completed,

and the Maximilian bridge re-constructed, in 1903. The royal residence, a magnificent pile, was commenced in the beginning of the 17th century, under Maximilian 1. The cathedral dates from 1368. Among other build-ings of great architectural beauty are the Glyptothek, the new Pinakothek (both picture gal-leries), the National Theatre, the new Courts of Justice (1897), and the Imperial Bank (1901). In addition to the university (4,500 students), there are numerous educational institutions. The royal library is the most valuable in Germany, while the art collections are unrivalled. Music and the drama are in a flourishing state. The famous Fliegende Blätter, Jugend, and Simplicissimus are published in Munich, which is the home of countless literary, scientific, geographical, and other societies. The principal industry is brewing, twentyfour breweries producing annually some 76,000,000 gallons of beer, of which about a half is exported. Leather goods, gloves, machinery, artificial flowers, lithographs, carriages, embroideries, gold and silver articles, and scientific instruments form other branches of commerce. The town was founded by Henry the Lion, Duke of Saxony, in the middle of the 12th century. It was taken by the Swedes under Gustavus Adolphus in 1632. King Louis I. (1825-48), a great patron of the arts, did much towards embellishing the town. In his reign the university, originally established at Ingolstadt in 1472, and re-moved to Landshut in 1800, was transferred to Munich. King Maximilian II. (1848 64) followed in his father's footsteps, but devoted more care to the development of the sciences. He founded the Maximilianeum and the National Museum, and gathered round him many of the principal scientists of the day. Pop. (1900) 499,932.

Municipal Corporation. See LOCAL GOVERNMENT.

Municipality, a term applied sometimes to the town regarded as a distinct administrative unit, and sometimes to the body (town council) which carries on the administration. A second ambiguity is commoner in America. In the province of New Brunswick, Canada, for instance, 'municipality' refers only to rural, and not at all to urban, administrative units. Rome and the Roman empire started from a city, and the Romans founded municipalities in every region they conquered. These municipalities, unlike modern cities, had jurisdiction over large areas of surrounding country. There were thus no rural authorities, and what rights of

self-government the municipalities enjoyed were confined to the citizens, who, however, did not require to be residents. These municipalities kept alive a certain local sentiment. The mediaval municipality arose after the barbarian invasions. Except, perhaps, in the south of France, they had no connection with the old Roman municipalities. The mediaval city is sharply contrasted with the rural districts. It was the abode of freedom; the country districts were in the iron grip of feudalism. It was the abode of peace, and very often of art and letters; the country districts were held by an arrogant but illiterate nobility, who were by no means always able to show a superiority in arms over the despised burghers. The cities, owing to the enfeebled condition of the central power, were able often to translate self-government into practical political independence; and the immense superiority of the means of defence over those of attack enabled them to defy the lesser nobility. The invention of gunpowder and the growth of modern states put an end to the independence of the cities. In England they never gained such independence; but there the cities were smaller-agriculture, not commerce, being the staple-and the king was stronger than on the Continent. The modern municipality is little more than an organ of local government. It has in many cases been created by legislation. In America there is a disposition to supersede representative government by a practical dictatorship in the hands of a mayor, who is popularly elected. In the United Kingdom municipal administration is carried on by popularly elected bodies, which have from inheritance and from legislation comparatively large powers. In America the muni-cipality is limited by its charter, and (e.g. in New York city) the legislature tends to be jealous of the large municipalities. In Prussia the administration is largely in the hands of municipal experts, who are promoted from the small cities to the large as they show efficiency. France the administration of the commune is to a large extent controlled by the central administration, through officials appointed by itself.

Municipal Trading. The growth of municipal enterprise has been an important feature in the recent political life of modern nations, and particularly of Great Britain. It is a necessity of the public well-being that there should be an efficient supply of water and light and open spaces, and that proper housing ac-

commodation and transit facilities should exist. Broadly speaking, Parliament in the United Kingdom has delegated to local authorities the duty of seeing that these necessities are provided, though not necessarily that the authorities should themselves provide them. The number of corporations in England and Wales is 317, and 299 of these carry on themselves one or more of these undertakings, which are classed as 'reproductive.' The following comparative table (Table I.) will best show recent progress.

The principal classes of reproductive undertakings and their relative profitableness are shown in Table 11. The figures refer to the municipal corporations of England and Wales, and are taken from the latest official return, Sessional Paper, No. 398.

It must be remembered that the net profit or loss is arrived at after allowing for repayments of principal. As regards water and gas, which are the best examples of public monopolies, most of the great cities make large profits, which go to the relief of rates,

Table I.

	Mar. 31, 1898.	Mar. 31, 1902,
Capital provided	£88,152,595	£121,172,371
Capital borrowed	83,379,931	117,032,923
Capital paid off	11,720,904	16,246,519
Sinking funds	3,203,597	4,644,985
Average annual income	8,898,376	13,040,411
Average annual working expenses	5,319,597	8,228,700
Difference between annual income and work-		
ing expenses	3,613,668	4,812,005
Annual payment for principal and interest	3,127,271	4,240,450
Annual depreciation	81,167	193,274
Annual net profit	370,341	378,281

Table II.

No. of Under- takings.	Description of Undertaking.	Capital Out- standing.	Average Annual Net Profit or Loss.
193 97 102 45 228 138 143 24	Waterworks Gasworks Electricity supply. Tramways Markets Baths and washhouses Burial grounds. Working-class houses.	£49,556,717 18,497,587 11,192,779 8,572,924 3,926,671 1,232,659 1,313,405 1,090,340	Profit £90,128 Profit 394,825 Loss 11,707 Profit 99,318 Profit 83,782 Loss 124,295 Loss 63,784 Loss 63,784 Loss 26,978
43 16	Harbours, piers, etc Miscellaneous	4,936,816 466,506	Loss

From these figures it will be seen that the large extra capital borrowed has brought in an increase in gross profit of nearly £1,200,000; but this has been almost entirely absorbed by the increase in the annual payment for principal and interest, and the amount set apart annually for depreciation. The increase in net profit is infinitesimal; but this is accounted for mainly by the fact that the new capital has been borrowed largely for electric supply and tramway undertakings, which have not been long enough in existence to create any considerable profits. Between 1898 and 1902 sixty-two electricsupply and thirty tramway undertakings were commenced by corporations. Allowing, however, for this fact, and for the greater accuracy in accounting of the later return, it appears to be true that in the earlier period trading undertakings were conducted on a more profitable basis than in the years 1898 to 1902.

and supply gas at a cheap rate. Manchester, for example, applies £50,000 a year from its gas profits to the relief of rates. Similarly, in thickly-populated areas tramways yield a large surplus, though, as a general rule, the authority can obtain better financial results by owning the system and leasing it to private adventurers. In London the County Council will shortly be owners, and for the most part operators, of all sys-tems in its area; while Glasgow owns and operates more than 100 miles of trams, yielding a magnificent service and a very handsome profit. Liverpool is an example of the advantage of owning both the electric supply system and the tramways. It is a matter of controversy as to whether municipalities should aim primarily at a profit, or at supplying necessities at the lowest possible price. In ten years—1892 to 1902—the outstanding loans of local authorities in England and Wales increased by £142,000,000, and now amount to over £343,000,000; while those of the United Kingdom aggregate £407,000,000. The burden of local rates in the United Kingdom is a very heavy charge upon the manufacturer, especially in his competition with foreign countries. Moreover, the necessary improvements in all large towns are rendered more costly if municipal credit is depreciated. This can only be avoided if the great undertakings are managed on a strictly bus.ness basis.

The housing of the working classes presents to municipalities one of the most difficult and least remunerative of their duties. All the great cities have adopted schemes for clearing insanitary areas and covering them with suitable dwellings, mostly of the tenement block type. In very few cases has it been found possible to build cheaply enough to secure a return immediately remunerative, though eventually a large profit may be made out of the increased value of the land. The London County Council has been the most ambitious and energetic authority in this respect. But the tenants displaced are rarely the tenants who occupy the newly-crected dwellings. There is a danger that the destruction of one 'rookery' may lead to the creation of another. Gratifying results have been obtained in many cities in the reduction of the death-rate, particularly in Birmingham, Glasgow, and London.

A Joint Select Committee was appointed by Parliament in 1900, and reappointed in 1903, to consider and report as to the principles which should govern powers granted to municipal authorities for industrial enterprise. A large amount of evidence was taken, but no general conclusion as to the limitations of powers was reached. It was, however, recommended that professional accountants should in all cases be employed to audit all accounts; that separate accounts of all trading undertakings should be kept; and that due provision should be made out of revenue for the repayment of loans. This is a very important matter, as efficient audit would be the best check against the possible danger of corruption and concealment. In Scotland an effective system of audit exists, and also for county councils and the London borough councils.

Another important consideration is the effect upon private enterprise. So far as Great Britain is concerned, the development of electricity, both as regards the supply of power and the manufacture of special machinery and fittings, has been somewhat hampered by the fact that so many municipalities own gasworks, and exclude private undertakings. The use of electricity for traction has, how-ever, forced the hands of the municipalities in this respect. As regards housing, individual speculators are unlikely to build on a large scale in any area where the local authorities are engaged in the same work, as the low rate of interest sufficient to recompense the public body is insufficient to satisfy the private capitalist. The Works Departcapitalist. The Works Department of the London County Council is the most conspicuous example in the world of direct employment by a municipality, and it has been subjected to much criticism. At more than one election the principle of direct employment has been approved by the ratepayers of London, but it is very doubtful if the work is either more efficiently or more economically done by the council than by private contractors who possess the necessary plant and organization. The unnecessary duplication of plant is in itself uneconomical, and must lead in certain cases to capital standing idle. Most cities, however, avoid direct employment on a large scale, and entrust their great operations to private employers, securing the proper treatment of labour by clauses in the contracts. Corporations have also entered into competition with traders in connection with the manufacture and sale of gas and electric fit-tings and the sale of gas 'residuals.' The later policy of Parliament has been to restrict development on these lines, except in so far as the interests of the corporation's own consumers are benefited, or where the byproducts are an important element in the making of a profit. What are called 'novelties' in municipal undertakings would, if encouraged, largely hamper private enterprise; for example, powers have been asked to conduct banking, coal supply, pawn-broking, milk supply, saddlery manufacture, while certain authorities already possess cold storage undertakings. In some German cities drug stores are a municipal monopoly, while the well-known Gothenburg system is a proof that the trade in alcoholic drink can be managed by corporations with some advantages to the community. In the United Kingdom the authorities own depôts for the supply of milk.

These examples of collectivism encourage many socialist thinkers in the belief that municipal trading in Great Britain will be the means by which the sphere of state control will be widened until it embraces the entire range

of industry. The United States is a leading example of free competition, and there the tendency towards great aggregations of capital is seen in the creation of trusts. Against the American trust the socialist sets the state, and he claims that municipalistic monopoly is the only safeguard against the combination of capitalists. There is force in this contention; but in Great Britain political movements are rarely carried to their logical end.

See Darwin's Municipal Trade (1903); Fuirlie's Municipal Administration (1901); Fowler's 'Municipal Enterprise and Finance,' in Journal of Statist. Soc. (1900); O'Meara's Municipal Taxation at Home and Abroad (1894); and 'Report and Evidence of Joint Select Committee, 1900 and 1903,' in Municipal Affairs, vol. vi.

Murkacs, tn., Bereg co., N.E. Hungary, 70 m. E.S.E. of Kaschau; has manufactures of coarse cloth. Helene Zrinyi, wife of the patriot Tököli, held the old hill fortress for three years (1685-8) against

the Austrians. Pop. (1900) 13,640.

Munkacsy, Michael (1846-1900), Hungarian painter, whose family name was LIEB, but he took that of Munkaesy from his birthplace, Munkaes. His first important picture, The Last Day of a Condenned Prisoner (1868-69), gained a medal at the Salon, and established his reputation. Other pictures are Milton Dictating 'Paradise Lost' to his Daughters (Paris Exhibition, 1878), Christ before Pilate (1881), Golgotha (1883), Death of Mozart (1884), and Ecce Homo! After the completion of the last-named picture he was seized by brain disease, of which he died. Munkacsy was strong in characterization, and had the power of dramatic composition.

Munku Sardyk, sacred mountain of N. Mongolia, in E. part of Sayan range, 7 m. N. of Kossogol, 11,500 ft. above sea-level. The rivers Oka, Irkut, Ulu-kem (one of the head-streams of Yenisei) rise in its glaciers. The Mongols regard the ascent (first made by Radde in 1859) as impious. A vast deposit of graphite was discovered there about 1870.

Munro, Sir Hector (1726-1805), British general, was born apparently at Novar, Cromartyshire. In 1764 he suppressed the mutiny at Patna and won the battle of Buxar (Behar), which virtually subjugated Hindustan. After spending some years at home, he returned to India (1777), captured Pondichery from the French (1778), helped to gain the victory of Porto Novo (1781), and captured Negapatam. From 1768 to 1801 he sat as member of Parliament for the Inverness Burghs.

Munro, Hugh Andrew Johnstone (1819 85), Scottish classical scholar and critic, was born at semonar and critic, was born at Eligin. Elected a fellow of his college (Cambridge, 1843), he first attracted attention by his lectures on Aristotle; but his fame chiefly rests on his admirable editions of Lucretius (1860 and 1864). He also edited Horace (1868) and Criticisms and Elucidations of Catullus (1878; 2nd ed. 1905). The strongest point of his scholarship is sound judgment.

Munro, Neil (1864), Scottish author and journalist, was born at Inveraray. He began life as a journalist in Glasgow. His first story, The Secret of Heather Ale, appeared in the Speaker (1893). Others are The Lost Pibroch, short stories (1996); John Splen-did (1898); 'ilian the Dreamer (1890). (1899); Doom Castle and The Shoes of Fortune (1901); Children of Tempest (1903) mostly historical romances. He has power of characterization, poetical imagination, and thorough acquaintance with his countrymen.

Munro, ROBERT (1835), Scottish physician and archeologist, was born in Ross-shire. He com-bined the practice of medicine with archeological and anthropological studies till 1886, when he retired from the medical profession. He has made a speciality of lake-dwellings, and has written Ancient Scottish Lake-Dwellings (1882), The Lake - Dwellings of Europe (1890), Prehistoric Problems (1897), Prehistoric Scotland and its Place in European Civilization (1899), Archaeology and False Antiquities (1905), and Man as Artist and Sportsman in the Palwolithic Age.

Munro, SIR THOMAS (1761-1827), governor of Madras, was . born in Glasgow. He went to Madras as infantry cadet (1780); served under Sir Eyre Coote and Cornwallis. His name is chiefly associated with the system of peasant proprietorship known as ryotwar, which he elaborated. For his service in the Maratha war he was created baronet war ne was created baronet (1819), and was appointed governor of Madras. See Life by G. R. Gleig (1830); Menoir prefixed to his Official Writings, by Sir Alex. J. Arbuthnot (1881); Biogruphy by John Bradshaw, in

Rulers of India Series (1894).

Munster, prov., S.W. Ireland, comprising six counties (Clare, Cork, Kerry, Linerick, Tipperary and Waterford). The surface is in great part mountain-ous. The principal rivers are the Shannon, Bandon, Lee, Black-water, and Suir. In Kerry are water, and Suir. In Kerry are the beautiful Killarney Lakes. Previous to the English conquest the various principalities of the territory had been united into two kingdoms, N. Munster and

S. Munster. Area, 9,521 sq. m. Pop. (1901) 1,076,188.

Münster. (1.) Town, Prussian prov. Westphalia, 78 m. N.N.E. of Cologne; has numerous medieval buildings, including the Gothic church of St. Lambert (14th century), with three iron cages affixed to its western tower, in which in 1536 the bodies of the Anabaptist leaders were exposed. In the town hall, built in 1335, was signed the peace of Westphalia on October 24, 1648, which terminated the Thirty Years' war. The university was founded in 1771. The principal manufactures are linen and cotton goods, while Westphalian hams and pumpernickel (a coarse, black rve-bread) are exported. Distilrye-bread) are exported. ling, brewing, wood-carving, and glass-painting are thriving indus-A Saxon bishopric was founded here in 805 by Charlemagne; and three hundred years later, the monastery built by St. Liudger, whence the modern name of the town is derived, was fortified. The Anabaptists, under John of Leyden, established here the 'Kingdom of the New Sion,' which came to an abrupt end in 1535. Pop. (1905) 81,439. (2.) Town, Upper Alsace, Germany, at base of Vosges Mts., 11 m. s.w. of Kolmar; manufactures cotton and calico. Pop. (1900) 6,085. Münster, Sebastian (1489-

1552), German scholar, born at Ingelheim (Palatinate); entered the Franciscan order, but became a Lutheran (1529). After being court preacher at Heidelberg (where he also lectured), he went to Basel (1536), where he taught till his death. Edited the first Hebrew Bible produced in Ger-many; wrote a Hebrew grammar and a Chaldean grammar and dictionary; also a geography entitled Cosmographia Universalis See Hantzsch's S. Mün-(1544).ster, Leben, etc. (1898).

Münsterberg, tn., Silesia, Prussia, 37 m. s. of Breslau, cap. of former principality of same name; has breweries and brick and tile works. Pop. (1900) 8,159.

Münster-Ledenburg, Georg Herbert, Count zu (1820-1902), German diplomatist, the son of a Hanoverian statesman, was born in London; was (1856-64) minister to St. Petersburg. After vainly trying to save Hanover from annexation by Prussia, he entered (1866) the Prussian diplomatic service; sat in the N. German, afterwards in the Imperial, Reichstag; was ambassador to England (1873-81), and to France (1885-1901).

Muntjac, a small deer belonging to the genus Cervulus. The antlers of the male are short and simple, possessing only one process, which forms a short brow tine, but furnished with unusually long pedicles. In the male the upper canine teeth are large, and project visibly from the mouth as tusks; they are used as weapons. The body is long, the limbs and neck short, the gait rather clumsy and not rapid. Muntjacs are jungle animals, and haunt especially upland forests. The type form is Cervulus muntjac, the muntjac or barking deer of India; but other species occur in China.



Muntjac.

Muntz Metal, or YELLOW METAL, a kind of brass containing approximately 60 per cent. of copper and 40 per cent. of zinc. It can be rolled hot or cold, and, on account of its being cheaper and less corrodible than copper, is used for sheathing wooden ships.

Münzer, Thomas (1490-1525), leader of Anabaptists, was born at Stolberg in Harz Mountains, At first he joined the Protestant reformers; afterwards founded a new sect (called Anabaptists by its opponents), standing for 'inner light' and communism (1521). After being expelled from several places, he settled at Mühl-hausen in Thuringia, and was instigator and leader of the Peasants' war, which terminated disastrously at Frankenhausen (1525). He was taken prisoner in the battle, and executed. See Lif'.

in German, by A. Stein (1900).

Munzinger, Werner (183275), Swiss African explorer and linguist, was born at Olten in Solothurn: went to Egypt (1852); made exploration in Northern and Eastern Africa, investigating the languages and writing grammars (1861-2). As British consul at Massowah, he creatly aided the British Abyssinian expedition (1865) Appointed governor of Massowah, he annexed part of N. Abyssinia to Egypt (1871), and was governor-general of E. Sudan (1872). He was killed in a fight with Gallas near Lake Assai. See Life, in German, by J. von Keller-Zschokke (1890).

Muong Nai, or Moné, feuda-tory Shan state, Burma, w. of Salwin R. Area, 2,716 sq. m.

Pop. (1897) 23,673.

Muong-Pan, or Maingpan, feudatory Shan state, Burma. Area, 2,299 sq. m. Pop. (1898) 9,000.

Muradabad. See MORADABAD. Murana, a large eel abundant in tropical and sub-tropical seas. The murana of the ancients is M. hetena. Most species are predaceous, and are armed with strong pointed teeth, by means of which they seize the fish upon which they prey. They may reach a length of from six to eight feet, and are then formidable adversaries to man. The colouring is often vivid and beautiful, the Med-

painted surfaces or by spaces carved in relief. In ancient Egypt mural paintings were carried to a high pitch of merit between four thousand and five thousand years before Christ. The chief methods employed are: —(1.) Frescoes. -Pure colours, mostly obtained from earths, put upon damp plaster. This process, known long prior to the Christian era, was greatly developed in Italy during the 13th century, where the outstanding craftsmen were Raphael and Leonardo da Vinci. Modern

been executed by Boucher in France, Frank Brangwyn in England, and others; among these may be noted the ceiling of the Hôtel de Ville, Paris, by Picard. (4.) Mosaic.— Assyria, Egypt, Greece, and Rome all contribute to this brilliant art of decoration, and it was conspicuous in early Christian times. The tesserac, properly coloured, are fixed separately into cement—a process so simple as to have remained the same from earliest times to the present. Sir W. B. Richmond's decorations in St. Paul's Cathern



Mural Decoration: Mosaic work under the dome of St. Paul's Cathedral, by Sir W. B. Richmond.
(Photo by the London Stereoscopic Co.)

iterranean form being of a rich brown, marked with yellow spots containing a core of brown. See RELS.

Mural Circle, a now obsolete astronomical instrument; consisted of a graduated circle attached to a stone pier, and carrying a telescope that revolved freely in the plane of the meridian. The readings were made with microscopes fixed in the masonry. Airy substituted a transit circle in 1851.

Mural Decoration, the art of decorating walls, either by

English fresco painters include Tenniel. Ward, Dyce, Maclise, Cope, Watts, and Poynter. (2.) Tempera, or Painting in Distemper.—In this, the colours are mixed with gum, yolk and white of eggs, or wine. It is apt to darken speedily. Leighton's lunette in South Kensington Museum is done in spirit-fresco. (3.) Painting in Oils on Plaster.—Though Raphael and other great artists sanctioned this method, the results, generally, have been disastrous. Large mural paintings on canvas fixed to the wall have

dral exemplify the art. (5.) Sculpture, Terra Cotta, and Clay Modelling.—In this form, also, very early periods are distinguished by the very highest achievements—as, for example, the Assyrian bas-reliefs, and the unequalled friezes of Greece, such as that of the Parthenon and other great temples. In quite recent days, besides a host of French sculptors, we can point to artists of great merit in Alfred Drury, Brock, Thornycroft, and Frampton. A fine example of plaster modelled and

painted is in one of the halls of the Hôtel de Ville, Paris. 'Gesso' decoration, which is slightly different in method from the last, finds its strongest exponent in the works of Walter Crane. 'Sgraffito' is the term used to describe a design scratched (hence the word) on plaster, and then coloured in sections. (6.) Metal Decoration. -This has been tried in several directions, most happily, perhaps, in simple bronze. Mr. F. L. Jenkin has executed a very original and gorgeous series of panels, in which bronze, ivory, and mother-of-pearl are the materials. See Modern Mural Decoration (1902), by Baldry. (7.) Tiles. - Decorative treatment of this medium may be grouped under encaustic, embossed, hearth, and faïence. The simpler art dates from at least as remote a period as 521 B.C. on the walls of Babylon. Fine specimens of the Norman period are at the abbey of Voulton. The best Italian examples are by Lucca della Robbia (1400 - 1480) and by Bernard Palissy (c. 1500). The art has Palissy (c. 1500). The art has flourished long in Japan, and in England it is closely associated with the name of Minton. Practical Treatise on the Manufacture of Bricks, Tiles, etc., by Davies, and Shaw's Specimens of English Mediaval Tile Pave-ments. (8.) Embossed Linen.—In this art copper cylinders, engraved with the required patterns, are employed. Being mounted in calender frames, they are made to press against rollers having a yielding surface. (9.) Wall Papers. — This comparatively recent form of decoration consists in printing designs by two processes: (a) by hand from blocks, using separate blocks for each tint, or (b) by machinery from rollers. See White's Practical Designing.

Murano, tn., Italy, in Venice lagoon, 11 m. N. of Venice; has for centuries had a reputation for Its cathedral Venetian glass. dates from the 10th century, and has a fine collection of Venetian glass. Pop. (1901) 5,436.

Murat, JOACHIM (1767-1815), king of Naples, was born at La Bastide, near Cahors in France, and entered the French army in 1791. In 1793 he accompanied Napoleon 1. to Italy, and then to Egypt, and on their return dispersed the Council of Five Hundred. Napoleon rewarded him with the command of the consular guard, and the hand of his youngest sister, Caro-line (1800). Murat was a great cavalry leader. He commanded the French cavalry at Marengo, at Austerlitz, through the Prussian campaign, and again in Spain, and his dash and daring contributed not a little to the French victories. During the campaign against Russia he again commanded the cavalry, and after his master's departure the whole army; but after the disastrous battle of Leipzig he concluded a treaty with Austria. He had been made king of Naples by Napoleon in 1808. After Napoleon's escape from Elba, Murat declared war on Austria. He was, however, defeated at Tolentino, and after Napoleon's overthrow at Waterloo he escaped to Corsica, where he raised some troops, invaded Italy, was taken prisoner, and shot. See biographical works by Helfert in German (1878), by Guardione in Italian (1899), and by Chavanon and Saint-Yves in

French (1905).

Muratori, Lodovico Antonio (1672-1750), Italian scholar, was born at Vignola, near Modena; became prefect of the Ambrosian library at Milan, but was recalled to Modena by Duke Rinaldo I., who made him his librarian and court archivist (1700). His three great works are the Rerum Italicarum Scriptores (1723-1851), in which he edited and commented on the sources of mediceval Italian history; the Antiquitates Italicae Medii Ævi (1738-42), in which he treated of the constitution, customs, culture, and thought of that period; and the *Annali* d'Italia (first complete ed. 1753-56), which is a learned and criti-cal history of Italy from the birth of Christ down to the year 1750. The works of Muratori mark an epoch in the study of history, by reason of his scholarly use of documentary evidence. The Opera were collected in 36 vols. (1767-80), and in 48 vols. (1790-1810). The enormous Epistolario is being edited by Campori (1901 et seq.); and a new edition of the Scriptores is in hand. See Fiorini's Dci lavori preparatori alla nuova edizione dri Rer. Ital. Script. (1903). For Muratori's life, see the monograph by his nephew (1756), and Tiraboschi's Bibl. mod., iii. 320-346.

Muraviev, MICHAEL NIKOLAIE-VITCH (1845-1900), Russian statesman, entered (1864) the diplomatic service; gained the favour of Queen Olga of Würtemberg, of whose ambulance he took charge in the Russo-Turkish war. After the war he held diplomatic posts at Paris and Berlin, then became minister at Copenhagen, and subsequently imperial foreign minis-

ter (1897)

Murchison, SIR RODERICK IMPEY (1792-1871), Scottish geolo-gist, was born at Tarradale, Rossshire. With Sir Charles Lyell he visited Auvergne and Italy (1828-31). A man of indomitable energy, clear-headed, and strong-willed, he at length resolved to attack

the problem of the older rocks of Wales. This resulted in the publication (1838) of The Silurian System. This constitutes Murchison's chief title to fame. Unfortunately, personal differences arose between him and his collaborator, Professor Sedgwick of Cambridge, which ended in estrangement. Murchison also founded the Permian system; and he was one of the first to recognize the importance of the Devonian. He was chosen director of the Geological Survey (1855), and in 1866 was created a baronet. Sec Sir Archibald Geikie's Life of Murchison (1875).

Murcia. (I.) Maritime prov., S.E. Spain, part of former Moorish kingdom; fertile, sub-tropical district, between mountains and Mediterranean, including the fa-mous Huerta ('garden') de Murcia, 15 m. long by 5 m. wide, producing every sort of fruit and vegetable. It is watered by river Segura. There is also consider-Segura. able mining and some textile industry. Murcia was taken by the Moors in 713, and came under Castile in 1240. In 1305 the kingdom was divided between Castile and Aragon. Area, 4,478 sq. in. Pop. (1900) 577,987. (2.) City and episc. see, cap. of above prov., 250 m. s.E. of Madrid, on river Segura, in the centre of lovely Huotta. (foreign?) de Music. Huerta ('garden') de Murcia. The cathedral, Gothic-Romanesque, was begun in the 14th century; its striking tower was completed in 1766. Cloth, gunpowder, and flannel are manufactured. Pop. (1900) 111,539.

Murder is the unlawful killing of another with malice aforethought. The killing of another is presumed by the law to be murder until the contrary is shown, and the onus of proving that the killing was lawful-i.e. justifiable or excusable, or that it was without malice afore-thought—is on the accused. In England, but not in Scotland, the death must follow within a year and a day after the act causing death. The person killed must be in being; therefore killing a child in its mother's womb is not murder. Malice aforethought refers to the state of mind preceding or co-existing with the act or omission which causes death, and may mean any state of mind from a positive intention to kill some particular person out of hatred or ill-will down to that state of mind which consists in the mere knowledge that the act will probably cause the death of, or grievous bodily harm to, some person, even although such knowledge may be accompanied by a wish that death or grievous bodily harm may not be caused. A person found guilty of murder must be sentenced to death by hanging.

and, in Scotland, to confiscation of movable property. A person apprehended for murder in England or Ireland may be tried there, though the offence was committed abroad. On an indictment for murder a man may be convicted of homicide. It is not absolutely necessary, though usual, to find the body in a case of murder -e.g. in a case of cannibalism this would be impossible. See also ASSAULT and MAN-SLAUGHTER.

Murdock, or Murdoch, Wil-LIAM (1754-1839), Scottish engineer and inventor of coal-gas lighting, was born at Bellow Mill, near Old Cumnock. Ayr-He worked with Boulton and Watt at Soho, near Birming-ham (1777-1830). He began experimenting on the illuminating properties of gases in 1792, and put up an experimental apparatus at Soho (1800), with the result that gas was used in some of the illuminations after the peace of Amiens (1802). In 1808 he read a paper before the Royal Socicty describing his investigations which gained the Rumford medal. Murdock also invented the steam gun (1803), utilization of compressed air, iron-cement, and made improvements in the steamengine.

Mure, Sir William (1594-1657), Scottish poet, was born at Rowallane, Ayrshire. He fought in the civil war, on the parliamentarian side, and was wounded at Marston Moor. He wrote Latin verses and translations, original English poems—the chief of which is The True Crucifice for True Catholiks (1629) - and a Para-

Catholiks (1029)—and a Para-phrase of the Psalms (1639). Mure, WILLIAM (1799-1860), Scottish classical scholar, was born at Caldwell in Ayrshire. When twenty-two he wrote an article on Spanish literature for the Edinburgh Review, and subsequently some papers about ancient Egypt. He went a tour in Greece, and published an account of his travels (1838). great work is A Critical History of the Language and Literature of Ancient Greece (1850-7).

Muret, or Muretus, Marc Antoine (1526-85), French hu-minist, was born at Muret, near Limoges; spent his life in lecturing and editing the classics. After being twice imprisoned on unsubstantiated charges of immorality and heterodoxy, he led a wandering and insecure life. till he was invited by Cardinal d'Este to settle in Rome (1559), where he lived peaceably till his death. He was one of the best scholars and orators of his time. His Opera were edited by Ruhnken (1789) and Frotscher (1834-41). See Life, in French, by Dejob (1881).

Murex, a genus of gasteropods, including a large number of species, found all over the world. The animals are carnivorous, and the shells have an elongated canal, partly closed, a rounded aperture, and a surface-ornamentation consisting of longitudinal bands. They produce a purple dye, which in the case of certain Mediterranean species was one of the sources of Tyrian purple. M. tenuispina is remarkable for the numerous delicate spines with which the surface of the shell is covered. A common British species is M. erinaceus.

Murfree, MARY NOAILLES (1850), American novelist, widely known by her pen name of 'Charles Egbert Craddock,' was born at Grantlands, near Mur-freesboro, Tennessee. Her début in literature was made in 1878, when she contributed to the Atlantic Monthly the first of her many vivid pictures of mountaineer' life in Tennessee. selection of these stories appeared in 1884, under the title of In the Tennessee Mountains. The reve-Tennessee Mountains. The revelation, in 1885, that Charles Egbert Craddock was a woman came as a surprise. Her later books include The Prophet of the Great Smoky Mountains (1885), In the Stranger People's' Country (1891), The Bushwhackers (1899), and A Spectre of Power (1903).

Murfreesboro, tn., Rutherford co., Tennessee, U.S.A., 32 m. s.e. of Nashville; has manufactures of machinery and lumber products. The Federals under Rosencrans won a victory over the Confederates under Bragg in 1862-3. Pop. (1900) 4,000.

Murger, HENRI (1822-61). French novelist and poet, was a native of Paris. His first novel, Scènes de la Vie de Bohème (1845). was descriptive of his own privations and vicissitudes; indeed, dissipation prevented him from working with regularity, and he died in a hospital. Among his works are Le Manchon de Francine, La Vie de Jeunesse (1851), Madame Olymne (1859), Le Roman Madame Olymbe (1859), Le Roman d'un Capucin (1868), Les Yucances de Camille (1857), Les Buveurs d'Eau (1855), Le Pays Latin (1851), Le Sahot Ronge (1860), Le Dernier Rendezvous (1856), and a volume of verse, Les Nuits d'Hiver (1861). Andrew Lang has translated some of Murger's songs in his Ballads and Lyrics of Old France (1872). See Lives, in French, by Delvau (1866) and Ricault d'Héricault (1896).

Murghab. (1.) Head-water of river Oxus, W. Asia; rises in Little Pamir at alt. of 13,600 ft., and flows N.N.W. under name of Ak-su, then w. to its junction with the Panj, or S. head-stream of Oxus, at Wakhan. Its length is about 275 m. (2.) River of

Merv, rises in Afghanistan, on N. side of Safed Koh, and flows W., then N.W. to Russo-Afghan frontier, through the cases of Penjdeh and Merv, beyond which it is lost in the Kara-Kum sands. Length about 400 m.

Muriatic Acid. See Hydro-CHLORIC ACID.

Muridæ, a family of rodents, which not only includes the true ratsand mice (sub-family Murinæ), but also voles, lemmings, muskrats, and many others.

Murillo, BARTHOLOMÉ ESTÉ-BAN (1618 82), Spanish painter, born at Seville. He painted pictures for fairs, and is supposed to have supplied Madonnas for convents in Mexico and Peru. Fired by Van Dyck's success, he went to Madrid, where Velasquez was of material service to him. He rapidly attained to popularity, and in 1660 founded the Academy of Seville. A man of imagina-tive, genial temperament, he painted his religious pictures in accordance with the dictates of the church and the Inquisition. Nevertheless he never rose to dignity or elevation of expression; his plan was 'to supply the place of elevation by a dramatic exhibition of sentiment.' gypsy type of Madonna, his saints and children, drawn from the people, gained him wide popular-ity. Neither in his conception of his subject nor in the handling does he attempt complicated emotions or colour schemes; his aim is to please the eye. His realistic pictures of Beggar Boys and of Flower Girls (Dulwich Gallery) show where his natural bent lay. Had not the church given him its patronage, Murillo would no doubt have been pre-eminently the painter of the people. Great sums have been paid for his pictures. The French in 1852 paid £23,440 for his Immaculate Conception (Louvre). He painted in three manners: the first called frio, or cold; the second calido, or warm; and the third, vaporoso, is well exemplified in the National well exemplified in the National Gallery, London, by his important Pedroso and Holy Family. See W. B. Scott's Murillo and the Spanish School of Painting (1873), Sir W. Stirling-Maxwell's Annals of the Artists of Spain (1848), Charles B. Curtis's Velasure and Murillo (1883), Justiy quez and Murillo (1883), Justi's Murillo (ed. 1904), and Knackfuss's Murillo (5th ed. 1901).

Murman Coast, Arctic coast of Russian Lapland, between Norway and White Sea. It is deeply cut up by flords, and the shores are generally lofty and rocky. This is the only ice-free coast of European Russia N. of Crimea. At Port Catherine (mouth of Gulf of Kola) is the port and naval station of Ekater-

ininsk.



A Picture by Murillo-'Spanish Peasant Boys.' In the Dulwich Gallery, London.

Murner, Thomas (1475-1536), German satirist, was born at Oberchnheim in Alsace; became a Franciscau monk, and led the roving life of a scholar and poet in Germany and Switzerland. He was a vehement opponent of Protestantism, against which he wrote several satirical works notably Die Narrenbeschwörung (1512; new ed. 1893), Die Schelmenzunft (1512; new ed. 1890), Die Mühle von Schwymdelsheim (1515; new ed. 1883), and Die Güuchmatt (1519; new ed. 1896). Against Luther, whom he had at first greeted sympathetically, he levelled the bitter Von dem grossen Lutherischen Narren (1522; new ed. 1848). See Kawerau's Murner und die Deutsche Reformation (1801).

Murom, tn., Vladimir gov., Central Russia, 70 m. E.S.E. of Vladimir city, on high l. bk. of Oka. It manufactures leather, candles, and cloth, and has foundries, flour mills, and tile works. Pop. (1897) 12,589.

Murphy, ARTHUR (1727-1805), Irish writer, was born at Clomquin. Roscommon. He was an actor (1754-6); after that a playwright. He also practised as a barrister till 1788. His plays are chiefly adaptations of Molière and others. The comedies, which are superior to the tragedies, include The Upholsterer, The Way to Keep Him, The Grecian Daughter, Know your own Mind, and The Desert Island; and his chief tragedy is Zenobia. He also wrote a Life of Carrick (1801). See Biography by Foot (1811).

Murphysboro, tn., Jackson co., Illinois, U.S.A., 77 m. s.e. of St. Louis. Pop. (1900) 6,463,

Murray, riv., N.S.W., Australia, rises in Muniong range, flows W. through New South Wales, draining an area of 270,000 sq. m. Length, 1,300 m. It debouches into Lake Alexandrina. For the greater part of its course it forms the boundary between New South Wales and Victoria. From Lake Alexandrina it flows into Encounter Bay, where a bar prevents the entrance of shipping of any draught. The chief tributaries are; on the r. bk, the united Murrumbidgee and Lachlan, and the Darling; on the l. bk, the Goulbourn and Loddon. It is navigable as far as Albury.

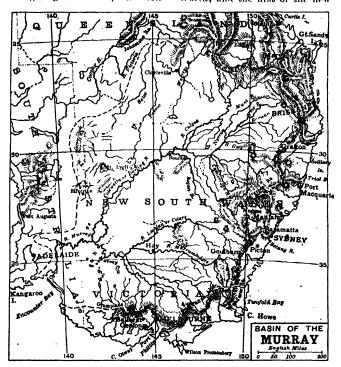
Murray, Alexander (1775-1813), Scottish philologist, was born at Dunkitterick, Kirkeudbrightshire. He became minister of Urr (1806); was appointed professor of Oriental languages in Edinburgh University (1812). He died before the publication of his chief work—the History of European Languages (ed. by Dr. Scott, 1823). See Life by Sir H. W. Moncreiff, prefixed to the History of European Languages.

Murray, ALEXANDER STUART (1841-1904), Scottish archeologist, was born near Arbroath. He became assistant in the Greek and Roman Antiquities Department, British Museum (1867), and keeper (1886). He lectured on archeological subjects, and directed excavations in Cyprus (1894). His principal works are Manual of Mythology (1873), History of Greek Sculpture (1880-83), Handbook of Greek Archeology (1892), Excavations in Cyprus (1900), and Sculptures of the Parthenon (1903).

Murray, Alma (Mrs. A. Forman), English actress, was born

Russo-Turkish war (1876). Since then he has mainly devoted himself to fiction, his chief novels being A Life's Atonement, and Joseph's Coat (1880); Old Blazer's Hero (1887); Bob Martin's Little Girl (1892); Verona's Father (1903); and The Brangwyn Mystery (1906). He has also written Ned's Chum (a play in which he acted at the Globe, 1891).

Murray, EUSTACE CLARE GREN-VILLE (1824 81), English journalist. He became Vienna correspondent to the Morning Post. He was one of the first contributors to Vanity Fair and the World, and the first of the new



in London; made her début at the Olympie while still a child, and since 1879 has acted at the Lyceum and other chief theatres. She has taken leading parts at the performances arranged by the Browning and Shelley societies; she played Rosalind at Camberwell (1897), and is well known as a reciter. She married Mr. Alfred Forman, the Wagnerian.

Murray, Andrew Graham. See Dunedin and Stenton, Baron, Murray, David Christie

Murray, DAVID CHRISTIE (1847), English novelist, was born at West Bronwich, Stuffordshire, He was on the staff of the Birmingham Morning News and the Daily News, and special correspondent of the Times in the school of gossiping journalists. The Queen's Messenger, founded by him, was the forerunner of the 'society' papers. He spent the latter part of his life in l'aris, whither he had retired on account of a quarrel with Lord Carrington (1869). He wrote novels, light essays, and character sketches, his chief novel being Young Brown, partly autobiographical (1874). See Memoirs of Grenville Murray, ed. by his widow (1887).

Mürray, George Gilbert Aimk (1866), English author, was born in Sydney, N.S.W., and was appointed professor of Greek at Glasgow University (1889). He is the author of Gobi or Shamo (1889 99), novel; Historyof Ancient Greek Literature (1897); books on Euripides (1901-4); and a couple of plays, Andromache (1900), and Carlyon Sahib (1899). Murray, James Augustus Henry (1837), English lexicographer, was born at Denholm, near Hawick, Roxburghshire. From 1855 to 1885 he was engaged in teaching, from 1870 at Mill Hill, near London. In 1879 he under-took, for the Philological Society and Oxford University Press, the editorship of the New English Dictionary on Historical Principles (in course of publication), one of the greatest philological works in any language. The purpose of this dictionary is to furnish an adequate account of the meaning, origin, and history of English words now in general use, or known to have been in use at any time during the last seven hundred years.' Among his books are The Dialect of the Southern Counties of Scotland (1873), and editions for the Early English Text Society of the works of Sir David Lyndesay (1871) and Thomas of Ercildoune (1875).

Murray, Sir John, of Broughton (1718-77), secretary to Prince Charles Edward ('45), was son of Sir David Murray of Stanhope, Peeblesshire. He was employed on missions to the Pretender, whom he joined on his landing. After Culloden he became a fugitive, but was eventually taken prisoner, and turned

king's evidence.

Murray, SIR JOHN (1841), British naturalist, was born at Coburg, Ontario. He visited Spitzbergen on a whaler in 1868, was one of the naturalists on the Challenger (1872 6), and after assisting in the compilation of the Scientific Results of the expedition in 50 vols., became editor in 1882, contributing from his own pen the narrative of the expedition and the description of the deep-sea deposits. Of late he has been super-intending a bathymetrical, physi-cal, and biological survey of the fresh-water lakes of Scotland.

Murray, John, a famous pub lishing house founded in 1768 hisning house founded in 1708 by John MacMurray (1745-93), who purchased the bookselling business of William Sandby. Among his publications were Walpole's Castle of Otranto, Langhorne's translation of Plutarch's Lives, The English Review, Mitford's History of Greece, Lavater's Physiognomy, and the first two volumes of Disraeli's Curiosities of Literature. On his death he was succeeded by John Murray the second (1778-1843)the 'Anak of publishers,' according to Lord Byron. In 1803 he became London agent for Archibald Constable, sharing in Marmion and other important works, and also acted as London agent

for the Edinburgh Review. In 1809 he started the Quarterly Review, on Tory principles, in op-position to the Edinburgh Review, with the support of Canning, and with Gifford as editor, and Scott and Southey among the contri-butors. In 1812 Murray removed to Albemarle Street. Mrs. Rundell's Cookery was one of his most successful speculations. He acted as publisher for Byron, Jane Austen, Irving, Crabbe, Campbell, Lyell, Moore, Borrow, Napier (Peninsular War), Croker (Boswell), Mrs. Somerville, and others. In 1824 Murray became others. In 1824 murray occani-involved in the dispute regard-ing the publication of Byron's Memoirs. At the suggestion of Benjamin Disraeli, Murray started in 1826 a newspaper entitled The Representative, over which £26,000 was lost in the course of its six months' career. In 1829 he began the issue of his Family Library, a series of popular treatises by Scott, Southey, Milman, Palgrave, and others. Among the chief of his other publications was the series of (Iuide Books. He was succeeded by his son John Murray the third (1808-92), under whom the Grote, Dr. William Smith, Milman, Darwin, Dean Stanley, Whymper, Dr. Smiles, Du Chaillu, Lord Campbell, and Chaillu, Lord Campbell, and others. He was an enthusiastic traveller, and wrote guide-books on Holland, France, S. Germany, and Switzerland. The firm is now under the control of his son, John Murray the fourth (b. 1851), the editor of Gibbon's Autobiography. See A Publisher and his Friends, by S. Smiles (2 vols. 1891).

Murray, LINDLEY (1745-1826), Anglo-American grammarian, was born at Swatara, Pennsylvania. In 1784 he settled in England, where he published his English Grammar (1795), English Reader (1799), and English Spelling Book (1804). For many years these were the only text-books used in the majority of English schools. See *Life* by Egle (1885). **Murray,** WILLIAM. See MANS-

Murree, or Marri, hill sana-torium, Ráwal Pindi dist., Pun-jab, India, 85 m. s.w. of Srinagar. Alt. 6,344 ft. Pop. (1901) 1,844. Mürren, vil. (5,363 ft.) in Ber-

nese Oberland, Switzerland, 3 m. s.w. of Lauterbrunnen. It is opposite the Jungfrau, and is a summer resort. Pop. 200.

Murrumbidgee, riv., N.S.W., Australia, rises in Muniong range in the S.E. corner of the colony, and flows 1,350 m. before meeting the Murray. It is joined by the Lachlan (700 m. long), and is navigable for 500 m. during the wet season.

Murshidabad, chief city in dist. of same name, Bengal, India, on l. bk. of Bhagirathi, a branch of Ganges, and 115 m. N. of Calcutta. It was the Mohammedan capital of Bengal during the 18th century, and contains the beautiful palace of the nawab, completed in 1840. Its industries include ivory carving, gold and silver embroidery work, and silk-weav-ing. Pop. (1901) 15,168, with ng. Pop. (1901) 15,168, with Azimgani (on opposite bank of river), 28,557; area of dist. 2,144 sq. m., pop. (1901) 1,333,184. Murten. See Morar. Murtoza, fishing centre, Aveiro,

Portugal, 6 m. N. of Aveiro. Pop.

(1900) 9,881

Murviedro. See Sagunto.

Murzuk, chief tn., Fezzan, hinterland of Tripoli, N. Africa, 300 miles s. of Sokna. It produces leather and textiles. Pop. 6,500.

Musaceæ, a natural order of large tropical herbaceous plants, generally without true stems, with large, handsome leaves and flowers aggregated on spadices protected by spathes. Among the genera are Abaca and Musa.

Musæus, Greek grammarian, author of Hero and Leander, which cannot be placed earlier than the 5th century A.D. Edition—Schaefer (1825); it is contained in Marchant's A Greck Anthology (1899). It has been often translated into English,

notably by Marlowe.

Musaeus, JOHANN KARL AUGUST (1735-87), German author, was born at Jena. In 1763 he became professor at Weimar gymnasium. His principal works were Der deutsche Grandison, a parody on Richardson's novel (1760), Physiognomische Reisen (1778), and Volksmärchen der Deutschen (1787), which has appared in many editions both in peared in many editions both in German and English. In 1791 there appeared a collection of his posthumous pieces, with a Life by Augustus von Kotzebue.

Musa Ibn Nosair (640-715), Arab conqueror of N. Africa from Tripoli to Morocco; then, forming an alliance with Count Julian, crossed over (712) to Spain, and took Seville and other towns. On his return he fell into disgrace with Caliph Soly-

man, who exiled him.

Mus.B., Bachelor of Music Musca, a southern constellation N.E. of Chamæleon, figured by Bayer in 1603 under the name of Apis (the Bee), but des-ignated Musca Volans by Bartsch (1627). R Muscæ is variable in a period of 20 hours; a Muscæ is a third-magnitude helium star; and B Muscæ is a revolving pair, divided by H. C. Russell in 1880.

Muscæ Volitantes, shadows cast upon the retina, which appear to the patient as black spots moving with his eye when he

looks at a uniform white surface. They are not necessarily pathological, as they may be caused by shreds of opaque tissue in the posterior part of the vitreous humour. In other cases they are purely subjective sensations, comparable to flashes of light. They are frequently more in evidence during passing gastric disturb-ances or bilious headaches, and they are more readily seen by patients with myopia.

Muscardine, a disease of the silkworm, due to a fungus belonging to the genus Cordiceps, which includes other species that attack the larvæ and pupæ of various butterflies and moths.

Muscari. See GRAPE HYA-

Muscat, Maskat, or Muskat, seapt. and cap. of independent state of Oman, Arabia, on s. shore of Gulf of Oman. It is under British political influence, and is the residence of the sultan. climate is hot and unhealthy. climate is hot and unhealthy. The exports (dates, hides, horses, asses, pearls, and drugs) were (1905) valued at £178,050, the imports at £371,945. Taken by the Portuguese in 1508, it remained under their rule till the 17th century. Pop. 40,000.

Muscatelle, Muscadel, or Muscadine, a strong, sweet, delicious white wine produced in

licious white wine produced in Languedoc. The name is also applied to both red and white wines (Moscado) of Italy and other places, especially those other places, especially from the muscadine grape.

Muscatine, city, Iowa, U.S.A., co. seat of Muscatine co., on the Mississippi, 130 m. E. of Des Moines. Pop. (1900) 14,073. Muschelkalk, a shelly lime-stone which constitutes the middle

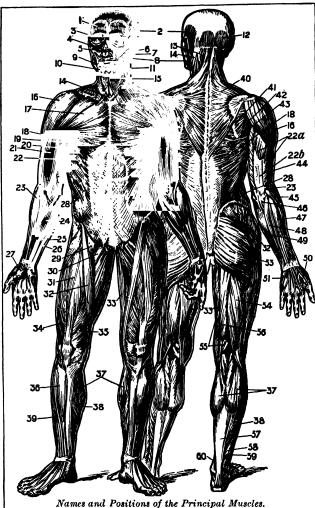
subdivision of the Triassic system or New Red Sandstone. It is not

found in Britain. Muscles, the organs of motion consist of bundles or fasciculi of parallel reddish contractile fibres. Voluntary muscles are under the control of the will, and their fibres exhibit a cylindrical form, with minute transverse stripes or striæ. The bundles of fibres are bound together by connective tissue, which also forms a sheath for the whole muscle. Each fibre has a membranous envelope which is blended with the tissues of the tendon. Within this investment lie the sarcous or true muscular elements. The involuntary muscles are found chiefly in the walls of the hollow viscera, such as the bladder, the blood-vessels, and the intestine. Their fibres are spindle-shaped and non-striated. They are gen-erally bound into flattened bundles by a cement substance and ordinary areolar tissue. One

great involuntary muscle, the

heart, is composed of striped

muscular tissue which differs in some respects from that of the and with nerves which terminate in the fibres. The normal stimu-



Frontalis Temporalis.

2. Temporalis.
3. Orbicularis palpebrarum.
4. Compressores nasi.
5. Levator labii superioris alsaque nasi.
6. Zygomaticus minor.
7. Zygomaticus major.
8. Masseter.
9. Orbicularis oris.
10. Depressor labii inferioris.
12. Orbicularis oris.
12. Osperasor labii inferioris.
13. Sulenius cantis.

 Spienius capitis.
 Sterno cleido-mastoid. Platysma myoides.
 Deltoid.

16. Deitoid.17. Pectoralis major.18. Latissimus dorsi.19. Coraco brachialis. 20. Serratus magnus.

21. Biceps.
22. Triceps (inner head).
22a. Triceps (main portion).
22b. Triceps (tendon).

23. Supinator longus. 24. Flexor carpi radialis. 25. Palmaris longus. 26. Flexor carpi ulnaris.

27. Abductor policis. 28. Obliquus externus. 29. 30. Ilio paoas. Pectineus. 31. Rectus femoris 32. Sartorius. 33. Gracilis.

Vastus externus. Vastus internus. Tibialis anticus. Gastroenemius. 34. 35 36. 37.

Extensor longus digitorum.

40. Trapezius.
41. Infraspinatus.
42. Teres minor.
43. Teres major.
44. Brachialis anticus.

44. Brachian anticus.
45. Extensor carpi longior.
46. Anconeus. [torum.
47. Extensor communis digi48. Extensor minimi digiti.

47. Extensor minimi digit.
48. Extensor minimi digit.
49. Flexor carpi uluaria.
50. Abductor indicia.
51. Abductor minimi digiti.
52. Gluteus mediua.
53. Gluteus major
54. Biccps flexor cruris.
55. Semi-membranosus.
56. Semi-tendinosus.
57. Tendo Achillis.
59. Peroneus brevis. 57. Tendo Acmins. 58. Peroneus brevis. 59. Peroneus longus. 60. Flexor longus digitorum.

lus is nervous, but the muscles may also be made to contract by electrical stimulation, by a

voluntary muscles. All muscles are abundantly supplied with capillaries which run between. pinch, or by a blow. After death the muscles lose their elasticity and their contractility, passing into the state known as rigor mortis. In the production of muscular work a considerable increase takes place in the amount of oxygen used by the body. As a result of prolonged or repeated use, both voluntary and involuntary muscles increase enormously in size through the formation of new fibres. (See Physical Training.) Disuse, on the other hand, and loss of nerve supply lead to atrophy and diminution of the muscle substance. Small particles of the heart muscle will continue to contract rhythmically for hours after their removal from an animal if they are kept moist and warm.

Muscle may suffer from the general dissemination of pyæmia or of carcinomatous or sarcomatous growths, as well as from the extension of epithelioma. Atrophy of the muscles is generally secondary to disease of the motor centres or nerves, by means of which the muscular tone is preserved in health. In such cases the fibres waste, and may undergo degeneration, until the whole muscle is so disorganized as to be represented by a mere fibrous band. In pseudo-hypertrophic paralysis the connective tissue between the fibres undergoes great hypertrophy at the expense of the contractile tissue, which is compressed and atrophies. Muscles are liable to ruptures and to wounds. The cut or torn ends may have to be approximated by sutures, and the parts must be kept at rest by suitable splints. Should suppuration occur in or around a muscle, free and early evacuation of the pus is impera-

Muscovite. See MICA.



Muscovy Duck.

Muscovy, or Musk Duck (Cairina moschata), an American duck, extending from Mexico to Argentina, which is often kept in confinement as an ornamental bird. It is a handsome species, with glossy green upper surface and crested head.

Mus.Doc., Doctor of Music.

Muses, in ancient Greek mythology, goddesses who were the especial patronesses of the various forms of literature. They are usually said to have been the daughters of Zeus and Mnemo-syne. At first they were three. Hesiod first fixed their number nestod first fixed their number at nine:—(1.) Clio, the muse of history: she is usually represented with a roll of papyrus, or with books. (2.) Euterpe, the muse of lyric poetry: her attribute is a flute. (3.) Thalia, the muse of comedy and other merry verse such as and other merry verse, such as bucolic idylls: she carries a comic mask, a shepherd's staff, or an ivy wreath. (4.) Melpomene, the muse of tragedy: she is distinguished by a tragic mask, the club of Hercules, or a sword; she wears a wreath of vine leaves and the tragic buskin. (5.) Terpsichore, the muse of choric dance and song: she is represented with a lyre. (6.) Erato, the muse of love poetry, also usually bears a lyre. (7.) Polyhymnia, the muse of the sacred hymn; she is usually represented in an attitude of reflection. (8.) Urania, the muse of astronomy, holds a staff with which she points to a globe. (9.) Calliope, the muse of epic poetry, is usually distinguished by a tablet and pen. From Thessaly their worship spread to Beetia, where Mt. Helicon, with its springs Aganippe and Hippocrene, was especially sacred to them. Mt. Parnassus, too, in Phocis, was a haunt of theirs. Apollo is often called Musagetes, as being the leader of the Muses.

Museums. The word 'museum,' a temple of the Muses, early came to be applied to any building for the study of literature or art, and so to institutions such as the university (founded about 280 B.C.) of ancient Alexandria, where, in addition to the famous library and other apparatus of study, were housed pictures, sculptures, and probably collections of natural history. Subsequently the term was restricted to this latter sense; and further, in English-speaking countries at least, the museum is not generally understood to include picture and sculpture galleries. Books and MSS., in so far as they convey ideas by language, pertain to the library; but as examples of printing, binding, or illumination, they find fitting place in the museum.

Museums may be classified in various ways. First, according to their contents, as of rocks and fossils, pictures, antiquities, machines, and the rest. Here a broad distinction lies between the art museum and the science museum; but the technical collections, illustrating the application of science to art, belong as

much to one side as to the other. A piece of pottery may be studied as a work of art pure and simple, as an illustration of the potter's craft (scientific study of clay, glaze, colour), as an archæological evidence, or as an illustration of ethnology. Hence the better division is based on ideas rather than on materials. Thus, we get a museum of religions (Guimet Museum at Paris), a museum illustrating the evolu-tion of man-made objects (Pitt-Rivers at Oxford), a museum of national life (Northern Museum, Stockholm), a museum of comparative anatomy (College of Surgeons), a museum of practical geology (London), of dynamic geology (Berlin), and so on. Secondly, one may distinguish museums as universal (e.g. the British Museum) or local (e.g. the museum of the Perthshire Society of Natural Science). A museum may be under national, provincial, or municipal control; or it may be run by some semi-public body—a university, a local society, or a trade guild; or it may be a purely private concern. Two hundred years ago nearly all museums were private property: they may have been owned by sovereigns as the Louvre (begun by French monarchs of the renaissance), the Zwinger of Dresden, and the collections of Louisa Ulrica of Sweden, described by Linnæus; or they were formed by princes of church or state—e.g. the Vatican and the Uffizi at Florence. Holland, in the days of its commercial supremacy, was the land of museums, made by its merchant princes; but one of the most notable, the Amboyna Collection of Curiosities of G. E. Rumphius, never reached Europe. In the New Atlantis of Francis Bacon occurs first the idea of a great national museum of science and art. But we owe more to the democratic ferment of the 18th century, and above all to the French revolution, which made the people masters of some of the finest collections in the world, and introduced a new era of museum administration. In Britain the transition came more peaceably through the will of the physician Sir Hans Sloane, and the Act of Parliament of 1753, purchasing his collection for £20,000, and providing for its accommodation, together with the Harleian Mss. and the Cottonian library, in Montagu House, Bloomsbury, under the title of the British Museum. This was opened to the public in January 1759. Admission to the exhibited galleries was at first by ticket only, on application in writing, and limited to ten persons for each of three hours in the day, the visitors being person-

placed is to be repeated (Fig. 4). When the compass of a composition exceeds the limits of the stave.



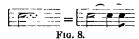
additional short lines, termed leger lines,' are written above or below the stave as required (Fig. 5). When music is written on two or more staves which are required to be performed simultaneously, the staves are connected by a



sign termed a brace (Fig. 6). The signs placed upon the stave to represent the pitch and duration of the sounds to be produced are termed notes. The small number of signs now used have been gradually evolved from the



various complex and elaborate systems which prevailed in early times. In these systems the signs used were always black, with this exception, that at one period red notes were sometimes introduced to signify that they lost a quarter of their original value. The use of white or open-headed notes dates from about the end of the 14th century, and is believed to have originated in France. The notes now employed to indicate different durations of sound are eight in number, and in English are termed breve, semibreve, minim, crotchet, quaver, semiquaver, demisemiquaver, semidemisemiquaver. In the order given each succeeding note is half the value of the preceding. The breve is seldom used in modern music, the semibreve being now regarded as the whole note, and the others having their values calculated as component parts of the semibreve. Signs termed rests are used to indicate periods of silence equivalent in time value to the notes which they represent. In the example (Fig. 7), notes are one or more dots after it. One dot after a note or rest prolongs its duration by half its original value, and a second dot-first used by Leopold Mozart-adds half the value of the first dot (Fig. 8). A third dot was sometimes employed by Mendelssohn, but its use has never become general. A sign ^



termed a pause or hold, is placed over any note or rest desired to be prolonged indefinitely. Dots or small vertical dashes (Fig. 9) placed over or under notes lessen the time duration of their sounds in proportions which vary accord-



ing to the nature of the composition and manner of performance. Groups of notes or passages which are required to be performed in a smooth and connected manner have a curved line placed over or under the notes.

The vibrational difference existing between two notes of unequal pitch is termed an interval. The smallest interval used in now in use consist of one form of major (Fig. 11) and two forms of minor scales—the melodic and harmonic (Figs. 12 and 13). Intervals of tones and semitones are employed in the construction of these scales, but the harmonic form of the minor scale contains another interval—that of an augmented second. The order of succession of intervals differs in each form of the diatonic scale. but the number of sounds in each scale is the same. In English the first seven letters of the alphabet are used as names for the different notes of the scale (Fig. 14), and the eighth note of a diatonic scale being always the replica of the lowest, one octave higher, the first and last notes of the scale have always the same name. Each note when prefixed by one or other of certain signs may represent several different pitches of sound. A scale may begin upon any note, but the keys of keyboard instruments, such as the piano and the organ, are so arranged and the instrument so tuned that the only complete modern scale which can be produced by using the white keys alone is the scale of C major termed the natural scale. notes in this scale having a definite pitch assigned to them, it follows that one or more of these



practical music is termed a semitone. Two or more sounds of the same pitch are termed unisons. A combination of sounds most nearly approaching the unison is produced when the higher of two sounds contains double the number of vibrations of the lower sound; the higher sound is then

notes will require to be raised or lowered when a scale begins upon any other note than C, so as to produce the desired succession of intervals. The notes which require to be altered from their original pitch in the scale of C are indicated by having sharps or flats placed upon their corre-



Fig. 11.—Major scale.

the replica of the lower at the interval of what is termed an octave. In the present system of music the interval of an octave is divided into twelve semitones, and the resulting series of sounds of different pitch constitute what is termed the chromatic scale (Fig. 10). Seven of these sounds, with the addition of the octave of the

Breve. Semibreve. Minim. Crotchet. Quaver. Semi-Demi- Semidemiquaver. semisemiquaver.

followed by corresponding rests. Each note or rest may have its duration augmented by placing lowest sound, are selected to constitute what are termed diatonic scales. The diatonic scales

sponding lines or spaces at the beginning of the stave. The signs thus placed constitute what is termed a key signature (Fig. 15). Sharps or flats when placed before occasional notes are termed accidentals; but when prefixing cer-tain notes they create a succes-sion of intervals which belong to another than the original scale of the composition, and they are then said to cause modulation. The lowest note of a scale is termed its tonic, and the name of this note indicates the key or scale in which the music is written. The names given to the notes on the stave are determined by the clef used. Music for all female voices is now written in the G or treble clef; and music for the tenor voice, when written on a separate stave, is usually written on this clef also, with the understanding that the notes sound an octave lower than written. But in four-part music, where two staves only are employed, the upper stave contains the music for soprano and contralto, and the tenor part is then written

monized vocal compositions were almost invariably performed without instrumental accompaniment.

History.—Amongst great composers in various countries before the 17th century were: Flemish—Dufay, Okeghem, Josquin, and Orlando di Lasso; French—Mouton, Genet, Lejeune, and Gondimel; English—Edwards, Tallis,



along with the bass part on the F or bass clef, in which clef music for the bass voice is always written. Music for the organ, piano, and kindred instruments, also for the harp, is written on two staves, the upper in the treble and the lower in the bass clef.

Musical compositions at one time were all purely melodic in structure. There is no evidence to show that the art of combining Byrd, Farrant, and Orlando Gibbons; German—Fulda, Isaak, Kinck, and Hasler; Italian— Festa, Animuccia, Corteccia, Gastoldi, Porta, and Palestrina. The last mentioned was the most eminent of all composers of the polyphonic school. During this period masses and motets were the principal forms of sacred compositions, while amongst harmonized secular works madrigals



sounds of different pitch to form harmony was practised until the 10th century; and it was several centuries later before music was written in more than two parts. The earliest known compositions were governed by certain forms of the scale, which at that period were termed modes. The latter were derived from ancient Greek prototypes, and until about the beginning of the 17th century all

(in which English composers were excelled by none) and canzonets were of chief importance.

The 17th century began a new era in the history of music. The man who originated what is known as the modern system of harmony was Monteverde, who in 1600, by first using unprepared dominant sevenths and other discords, not only introduced the dramatic element into music, but



music was composed in one or other of these modes. The style of composition adopted was follow

termed polyphonic, and consisted largely in constructing separate melodies in such a manner that when sounded simultaneously they produced harmony. Instruental music as a special branch of composition was still in its infancy, and until towards the close of the 16th century har-

paved the way for the numerous innovations in harmony which followed. Within a comparatively short period the system of music which had existed for centuries was almost entirely reconstructed. At this time also the monodic or homophonic style of composition came into existence. Its unlimited capabilities as a means of musical expression were first evidenced in the domain of

opera, a new art form invented about the close of the 16th century by Peri and Caccini, and founded upon the traditional principles of ancient Greek drama. Monteverde was the first distinguished exponent of the modern lyric drama, and the most celebrated composer of dramatic music of his time. In his skilful treatment of orchestral accompaniments he may also be said to have laid the foundations of our present system of instrumentation. Oratorio, or sacred drama, came into existence about the same time as opera, but the earliest composer who wrote oratorios in a form approximating that in present use was Giacomo Carissimi (1604-74). Serious music during the 17th century had its greatest number of exponents in Germany, where composers of sacred music still retained many of the characteristics of the old polyphonic system of composition, and developed the art of part-writing to a remarkable degree of excellence. Much attention was also given to the cultivation of all forms of instru-mental music, but especially to compositions for the organ, and the school of organists existing in Germany immediately after the reformation has scarcely since been equalled. France contributed little of importance until the appearance of Lulli, who was its first great composer of operatic music. In England, during the earlier part of the century the art of music, under the blighting influence of the Puritan reign, languished almost to extinction, but after the restoration it flourished exceedingly under the patronage of Charles 11. Amongst the composers of this period the greatest was Purcell (1658-95), whose works, in every then known form of composition, mark an epoch in the history of musical art.

The importance of instrumental music, not only as regards its use in accompaniment, but as a distinct branch of composition in both its solo and concerted forms. was now recognized, and its practice was assiduously cultivated in nearly every European country. Amongst the earliest writers of solo compositions for the organ were Merulo (1532-1604), whose toccatas did much to influence the future development of organ-playing; and Gabrielli (1557-1613), who wrote also numerous other instrumental works for combinations of from three to twenty-two instruments. The violin received its present form at the hands of Gasparo da Salo in Brescia (about 1550-1612), and some of the instruments produced by the famous Cremona school of violinmakers, especially those by the

families of Amati, Guarneri, and Stradivari, have never since been equalled for beauty of form and tone-producing qualities. Before the close of the century all instruments of the viol class had almost entirely given place to the present forms of stringed instruments-wiz. the violin, viola, 'cello, and double-bass. The first orchestral compositions of importance resulted from the development of the overtures or introductions used in dramatic music; and in their works of this class Scarlatti and Stradella employed a full string band, supplemented, as now, by wind instru-ments. The earliest known solo compositions for the violin are those by Marini (1620) and by Farini (1627). The first notable composer of violin sonatas was Vitali (about 1644-92), who was also the inventor of the variation form. The creator of the violin concerto -a solo composition. with orchestral accompanimentwas Torelli (1650-1708); but during the 17th century the greatest of all violinists and composers for his instrument was Corelli (1658 1713). Other eminent names connected with the development of violin-playing at this period are those of Vivaldi, Somis, and Veracini (Italian); Biber and Veracini (Italian); Biber and Walther (German). Solo compositions for the harpsichord, clavichord, and other precursors of the pianoforte played an important part in the development of instrumental music during the 17th century, and until the close of this period the lute, as an instrument of accompaniment, was as popular as the piano is at the present day.

The 18th century was the golden age of music, and during that period Germany became recognized as the greatest of all musi-Outstanding names cal nations. are J. S. Bach (1685-1750), Handel (1685 - 1759), Gluck (1714 - 87), Haydn (1732-1809), Mozart (1756-91), and Beethoven (1770-1827) From his skilful union of the old systems and the new, and his remarkable development of nearly all forms of music, Bach has been styled the founder of modern instrumental music. Handel first attained celebrity as an operatic composer, but during the latter part of his career he devoted himself almost exclusively to the composition of oratorios. Gluck. besides regenerating grand opera, was the first to use the overture as a means of foreshadowing the nature of the following work, and his skilful treatment of orchestration, exclusion of the harpsichord from, and introduction of the harp and trombones into, the orchestra did much to hasten the development of instrumentation. Haydn's extension of the sonata

form-that in which the greater number of important instrumental compositions, such as symphonies and chamber music, are written established the principles upon which all subsequent develop-ments of this form are founded. He was also the first to assign an almost equal degree of importance to the individual parts in quartets and other chamber music. His most valued vocal compositions are his oratorios, which rank with those of Handel in Mozart, a public estimation. Mozart, a pupil of Haydn, was the greatest operatic composer of his genera-tion, and his system of instru-mentation did more perhaps than that of any of his precursors to enrich the resources of orchestration. Beethoven was the greatest composer of absolute music of this or of any period. His symphonies and other orchestral compositions, chamber music, violin concerto, concertos and sonatas for piano, still reign supreme in their respective domains. In Italy, France, and England most attention was devoted to the cultivation of dramatic music, but in England the composition and performance of glees also held an important position.

Although the piano was invented (1711) in Italy, the first really eminent Italian pianist and composer for the instrument was Clementi (1752-1832), and until the close of the century the piano in its solo capacity had its greatest exponents in Germany. Many of J. S. Bach's compositions for the clavichord are also of the utmost value for the piano, notably his Wohltemperirtes Clavier, which is still an indispensable adjunct in the training of the modern pianist. Bach's son, Philip Emanuel (1714-88), was amongst the earliest known writers of definite compositions for the piano, and another son, John Christian (1735-82), was the first to give a public performance upon the pianoforte in Britain (London, 1768). Other names which claim special mention as pianists or composers for the instrument are Benda (1721-95), Haydn (1732-1809), Waxhall (1739-1803), Sterkel (1750-1817), Mozart (1756-91), Dussek (1761-1812), Steibelt (1764-1823), Müller (1767 - 1817), Beethoven (1770 - 1827), Weyse (1774-1842), Berger (1777-1839)—the teacher of Mendelssohn—and Hummel (1778-1837). In France the most important names were Gretry (1741-1813), Adam (1758 - 1848)—best known by his Méthode de Pianoforte-and Jadin (1769-1802); in England — Fisher (1744 - 1800), Hook (1746-1827), Wesley (1766-1837), and Cramer (1771-1858).

During the century the violin also greatly enhanced its reputa-

tion as a solo instrument. The Italian school of violin-playing originated by Corelli is that upon which all subsequent systems have been founded. In Italy the chief exponents of the instrument were Geminiani (1680-1761), the first to publish a violin school of any importance; Tartini (1692-1770), of his generation the greatest perhis generation the greatest performer, teacher, and composer for the violin; Locatelli (1693-1764), Ferrari (d. 1780), Giardini (1716-96), Nardini (1722-93), Pugnani (1727-1803), and Viotti (1753-1824). The last was a pupil of Pugnani, and resided for many years in Paris, where his compositions and style of personal his compositions and style of performance had much influence on the unrivalled school of violinplaying which, towards the close of the century, was established in that city. In Germany, the most celebrated violinists and composers for the instrument were Graun (1700-71), Benda (1709-86), Stamitz (1719-61), Cannabich (1731-98), Dittersdorf (1739-99), Wranitzky (1750-1808), Mozart, who was the first to develop the violin concerto to a position of importance; Eck (1774-1809), the teacher of Spohr; and Schuppanzigh (1776-1830), who taught Beethoven the viola, and was also the first great quartet leader. With the exception of those by Mozart, scarcely any of the violin compositions by the above composers are known at the present day; while works by Bach, Handel, Haydn, and Beethoven, who were not distinguished as violinists, constitute the greater part of what is termed classical violin music. In France those who contributed most to the development of violin-playing at this period were Léclair (1697-1764), several of whose compositions are still performed; Gavinies (1728-1800), whose Caprices, as regards technical difficulty, still rank next to those of Paganini; Kreutzer (1766-1831), the author of perhaps the most universally celebrated Studies; Baillot (1771-1842), an eminent teacher; and Rode (1774-1830), whose concertos still hold an important position. land the greatest violinists at this time were Dubourg (1703-67), Clegg (1714-42), Fisher (b. 1744), Linley (1756-78), and Pinto (d. 1773).

The violoncello did not come to the front as a solo instrument until about the latter part of the 18th century. Amongst the carliest eminent performers on this instrument were: Italian—Franciscello (1713-40), Boccherini (1740-1805); French—Bertau (d. 1756), Duport (1749-1819), the first to publish a treatise on the technique of the instrument; German—Romberg (1767-1841),

who did much to extend the resources of the instrument; and Stiastny (b. 1774), who wrote studies and many fine solo compositions; English—Crosdill (1751-1825), and Lindley (1776-1855), who, both as regards tone and technique, was the most celebrated 'cellist of his generation.

The clarinet (invented about 1690) was a most important addition to orchestral instruments. Mozart was the first to bring it into prominence in the orchestra; he also wrote some beautiful solo music for the instrument.

In the earlier part of the 19th century the greater number of eminent composers in every branch of music were of German nationality. Amongst names which have become famous are those of Spohr (1784-1818); Weber (1786-1826), the founder of the romantic school; Schubert (1797-1828), the creator of the art song; Mendelssohn (1809-47); and Schumann (1810 56). In Italy there were no really distinguished composers of orchestral or vocal music in its larger forms, apart from dramatic music; and in England the name of Sir W. Sterndale Bennett (1816—75) stands almost alone as a writer of great orchestral or choral works. In France, though most attention was still devoted to operatic music, the greater forms of instrumental and vocal compositions had also celebrated exponents in Berlioz (1803-69), Félicien David (1810-76). Ambroise Thomas (1811-96), and Gounod (1818-93).

During this period great improvements were effected in the construction of various instruments, such as the invention of the repetition action for the piano, and of the double action for the harp, by Erard; the re-construction of the flute by construction of the flute by Bochm; and the numerous alterations by Sax in the mechanism of other wind instruments. By the middle of the century the art and practice of music had become much more widely diffused, and Germany could no longer claim supremacy in the musical world. Outside the four chief musical countries arose Chopin (1809 49), Liszt (1811-86), Hun-Poland: gary; Rubinstein (1830-94), Russia; Gade (1817), Denmark; Raff (1822-82), Switzerland; César (1822 - 82), Switzerland; César Franck (1822-90), Belgium; Smetana (1824-84) and Dvorák (1841-1904), both Bohemians; Kjerulf (1815-68), Svendsen (1840), and Grieg (1843), all three Norwe-gians: M'Dowell (1861), American; Tschaikowsky (1840-93) and Glazounow (1865), Russian. In every branch of composition British composers, during the latter part of the century, have taken a very high place, the more eminent being Smart (1813-79), Macfarren

(1813-87), Prout (1835), Barnby (1838-96), Stainer (1840-1901), Parratt (1841), Sullivan (1842-1900), Cellier (1844), A. C. Mackenzie (1847), Parry (1848), Cowen (1852), Villiers-Stanford (1852), German (1862), Coleridge-Taylor (1862), and Elgar. Amongst German composers of this period outstanding names are those of Wagner (1813-83), whose conception and treatment of the music drama and use of the leitmotif are discussed under OPERA and WAGNER; and Brahms (1833-97), who, as a composer of absolute music, was perhaps the greatest of his time. Others are Reinecke of his time. Others are Keinecke (1824), Scharwenka (1840), Bruch (1838), Rheinberger (1859), Schulhoff (1825), Gernsheim (1839), Klindworth (1830), Jadassohn (1831), Jensen (1837-79), Hiller (1811), Humperdinck (1854), and Richard Strauss (1864), who, from the advanced nature of his work. is believed by many to be the is believed by many school of or-founder of a new school of or-chastral music. Well-known names belonging to France are those of Saint-Saëns (1835)-one of the greatest of living com-posers — Delibes (1836), Bizet (1838-75), Brassin (1840), Massenet (1842), and Mdlle. Chaminado; while representative names in Italy are those of Verdi (1814-1901), Sgambati (1843), and Mascagni (1863).

Among celebrated vocalists were Mmes. Catalani, Grisi, Clara Novello, Jenny Lind, Tietjens, Trebelli — soprano; Malibran, Alboni, Antoinette Sterling, and Patey—contralto; Rubini, Mario, Patey—contralto; Rubini, Mario, Sims Reeves—tenor; Lablache and Foli-bass. Amongst present-day singers are Mmes. Patti (1843), Albani, Melba, Marchesi, Nilsson-soprano: Clara Butt-contralto: Jean de Reszke, Ben Davies, Lloyd -tenor; Santley (1834) and Andrew Black-bass. Vocal methods by Garcia, Marchesi, Panseron, Concone, and Randegger are perhaps the best known. It is curious that while some of the greatest composers have also been distinguished as solo instrumental performers, there is scarcely an instance of an eminent vocalist who has also been known as a com-poser of other than songs and vocal studies. Bach and Handel were celebrated as organists; Mozart, Beethoven, Mendelssohn, Moscheles, Weber, Raff, Liszt, and Rubinstein as pianists; Spohr, David, and Joachim as violinists. Among the names of distinguished pianists of the cenguished pianists of the century are Moscheles (1794-1870), Mendelssohn (1809-47), Clara Schunann (1819-96), Chopin (1809-49), Liszt (1811-86), Rubin-stein (1830-94), Bülow (1830-94), Sir Charles Hallé (1819-95), Saint-Saëns (1835), Paderewski, Rosenthal, Siloti, Pugno, Pachmann, Busoni, Sapellnikoff, Moskowski, Sophie Menter, Carreno, Chaminade, Fanny Davies, and Leonard Borwick. Amongst standard technical works for the piano are studies by Clementi, Cramer, Czerny, Bertini, and Tausig; also the daily studies by Tausig. The most famous violinists during the century have been Pagaing the century have been Paga-nini (1782-1840), Spohr (1784-1859), David (1810-73), Ernst (1814-65), Ole Bull (1810-80), Vieuxtemps (1820-81), Wieniaw-ski (1835-80), Sivori (1817-94), Carrodus (1836-95), Lady Hallé (1840), Joachim (1831)—the great-set avyment of abscied avaicaest exponent of classical music-Wilhemj (1845), Sarasate (1844), Ysaye, Kreisler, César Thom-son, Kubelik, Marie Hall, and John Dunn. Standard schools John Dunn. Standard schools or studies for the violin are those by Spohr, Baillot, De Beriot, Rode, Kreutzer, Fiorillo, Gaviniés, Schradieck, Sevcik, and Joachim; also the Caand Joachim; also the Ca-prices of Paganini. The violoncello is the only other instrument, with the exception of the organ, which now receives much attention in solo performances. Dotzauer (1783-1860), Grütz-macher (1832), Servais (1807 t.6), Davidoff (1838), and Piatti (1823) are perhaps the best known of past 'cellists' while amongst those of the present day are Gerardy, Popper, Becker, Hollmann, Hausmann, and Klengel. Methods or studies for the 'cello: Dotzauer, Grützmacher, Davidoff, Kummer, Lee, Piatti, Romberg. Amongst the names of famous organists of the 19th century are Sir John Goss, H. Smart, Best, Widor, Bridge, Hopkins, Guilmant.

Conducting is a species of musical art which, as now practised, came into existence in the earlier partof the 19th century. Amongst the names of famous conductors, past and present, are those of Bülow—who was the first to set the example of conducting without score—Costa, Hallé, Manns, Richter, Henschel, Colonne, Cowen, Steinbach, Henry Wood, Weingartner, R. Strauss, and Nikisch.

With few exceptions, composers of distinction are still found only in the ranks of the profession; but the practice of music was never so universal as at the present day, and within recent years the standard of amateur executive ability has reached a high degree of excellence. Amongstall classes the study of music is regarded as an important branch of general education, and instruction in the art ranges from the teaching of sol-fa in elementary schools to the training of professional musicians in conservatoriums, colleges, or schools of music.

which are now established institutions in nearly all civilized countries.

For general histories of music see those by Burney (4 vols. 1776-89), Hawkins (5 vols. 1776-89), Hawkins (5 vols. 1868-76), Ritter (1880), Naumann (2 vols. 1882-6), Rockstro (1886), Parry (1891); The Oxford History of Music (1901-5); Chappell's Popular Music of the Olden Time (2 vols. 1815-59); Hullah's Modern Music (1861-75); Davy's History of English Music (1895); Riemann's Dictionary of Musicians (trans. 1896); Grove's Dictionary of Music and Musicians (4 vols. 1878-89); new ed. in progress, 1905).

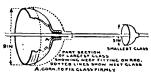
Musical Box, an automatic instrument developed from the musical snuff-box of the 18th The sounds are genercentury. ated by the vibrating teeth of a steel comb. The teeth are tuned to produce the notes of the musical scale, and their points are in juxtaposition to a revolving brass cylinder, which is set in motion by the winding of a spring. The surface of the cylinder contains small projecting pins, so arranged that as the cylinder turns they impinge upon and set in vibration the respective teeth which produce the desired combination or succession of sounds. A single cylinder may be 'noted' to play as many as thirty-six tunes, the change from one to another being produced by altering the position of the cylinder so as to bring a different series of pins into action.

Musical Glasses, a musical instrument consisting of a set of glasses of equal size containing water, and played with the moist-ened fingers, the height of the note being proportional to the quantity of water. They are first mentioned in 1651; but the first instrument of which we know particulars was invented by Puckridge early in the 18th century, and created a furore. Musical glasses were played by Gluck in London in 1746. Music was composed for them by Mozart and Becthoven. The instrument was improved by Franklin in 1760, and called sometimes the 'harmonica.'

Music and Dancing Licences.
Under the Disorderly Houses
Act, 1751, and the Local Government Act, 1888, all places used
for public dancing, music, or other
entertainment within twenty
miles of the cities of London and
Westminster must be licensed by
the London County Council or
by the Middlesex County Council,
if they are within that administrative county (Music and Dancing Licences (Middlesex) Act,
1894). The meeting of the licensing committee is held annually

in November. The council may make any conditions they think fit, and the buildings must conform to structural rules under the Metropolis Management and Building Acts Amendment Act, 1878. In other parts of England and Walcs, when Part IV. of the Public Health Act, 1890, is adopted, the justices issue licences at licensing sessions,





Benjamın Franklin's development of the Musical Glasses.

Music Halls. Readers of Pendennis will remember the little club called the Back Kitchen, held at the Fielding's Head in Covent Garden. This Back in Covent Garden. This Back Kitchen was really Evans's, Covent Garden, and was one of the numerous saloon theatres or singing halls attached to some of the larger public-houses, which were the forerunners of the modern music hall. They were licensed by the local magistrates. The lessees of the patent theatres were a close corporation, exceedingly jealous of their privileges. As the saloons, however, grew in importance, frequent legal conflicts took place. The culminating point was reached in 1834, when Samuel Lanc, his wife, and his whole company were fined for giving a performance of Othello at the Britannia Saloon, Hoxton. An agitation ensued, in which men like Dickens and Talfourd took a part, with the result that an Act of Parliament was passed abolishing the patents, and giving a limited measure of free trade in theatres. After this the saloons soon began to improve in character and importance. The first to lead the way was the Canterbury, in Westminster Bridge Road, and with it the modern music hall era began. The spirit which was thrown into its management by the late Charles Morton may be judged from the fact that it was here that London audiences were first introduced to Gounod's Faust. Morton then founded the Oxford, and other rivals speedily sprang into being all over London. Under the stress of this competition the old cellars of the Back Kitchen type gradually died out. The opening of the Alhambra in Leicester Square in the early sixties marked a further development; and after a renewed struggle with the regular theatre proprietors, the right to present ballets on the boards of the halls was vindicated. The transference of the powers of licensing from the magistrates to the county council on the establishment of that body in 1887 awoke a fierce agitation as a consequence of the stricter regulations enforced by the new licensing authority; but the halls have suffered no harm, and, on the whole, the artistic character of their performances has been considerably improved. Concurrently with the development of the music hall in London, there has been a great development of similar institutions in the large provincial towns of the United Kingdom. In the metropolis alone the annual applica-tions for music licences number over 300. The capital invested in these enterprises amounts to five millions; they afford employment to about 80,000 persons, and they entertain upwards of 25,000,000 people in the year.

Musk (Mimulus moschatus), a

Musk (Mimulus moschatus), a little woolly-leaved plant, with small yellow flowers throughout summer and autumn, yielding the characteristic fragrance. It is easily grown either out of doors or in pots. It likes a moderate degree of moisture at the roots.

Musk. See Musk-Deer. Musk-deer (Moschus moschiferus), an animal placed in a special sub-family of the deer family. Antlers are absent in both sexes, and in the male the upper canine teeth are very long, and project downwards in the form of tusks; but both these characters occur also in the Chinese water-deer. More important to the systematist are certain internal peculiarities, as that the surface of the brain is less convoluted than in other deer, and that a gall-bladder-absent in all other deer-is here present. Musk-deer are about the size of roe-deer. The legs are long, and the feet are remarkable for the great development of the lateral hoofs, these being, like the central pair, very freely movable, and thus giving the animals their characteristically sure footing on rough ground. The hair is coarse and brittle, and variable in colour, though usually dark brown spotted with lighter tints. In the male a small gland is found on the under surface, containing the secretion which furnishes the musk of conmerce. The hunters remove the gland from the dead animal, and wrap it up in a part of the animal's skin, when it forms what is known as a 'pod.' These pods are dried and exported to Europe, where their contents are used in the manufacture of perfumes. The musk-deer occurs in the highlands of Central and Eastern Asia, extending also to the south of Siberia. It is a mountain animal, and is found in pairs, not in herds. The musk of commerce mostly reaches Europe through China.



Musk-deer.

Muskegon, city, Michigan, U.S.A., co. seat of Muskegon co., I.S.A., to. seat of Muskegon co., Michigan, 45 m. N.W. of Grand Rapids. It trades in lumber and wood products. Pop. (1900) 20,818.

Musket. See FIREARMS. Musketry, the term applied to the theory and practice of shooting with military rifles. Success in the battlefield is attained mainly by superiority of fire. Officers and non-commissioned officers of the army have to pass through a course at the School of Musketry at Hythe in Kent. The annual course of musketry for the British soldier consists of six target practices of seven rounds, at from 200 to 800 yards, and of nine practices at moving or vanishing figures exposed to fire for three or four seconds. Eighty-four rounds per man are allowed for company and battalion practice, and general officers can in addition draw 4,000 rounds per battalion for field-firing. The musketry instruction of the auxiliary forces is much hampered by the difficulty of obtaining suitable ranges. Where ground is not available for the use of the regulation rifle, miniature ranges or even shooting galleries may be utilized by means of special cartridges or Morris tubes.

Musketry, School or, established at Hythe, on the coast of Kent, is the central seat of army instruction in musketry and the use of machine guns, and is the place in which officers, warrantofficers, and non-commissioned officers receive their teaching in those subjects. All experiments with small arms are conducted here. There are several courses of instruction every year, and each course terminates by an examination. At the head of the establishment is a commandant, having under him a chief instructor, an experimental officer, three instructors, four assistantinstructors, a quartermaster, and a medical officer.

A school of musketry was established at Bloemfontein, Orange River Colony, in October 1904, to enable the officers and non-commissioned officers of the South African garrison to pass their musketry examinations without having to come home to Hythe.

Musk-glands. Many manmals, more especially the social forms, have a portion of the skin modified to form a glandular region, producing a strong-smelling substance, by means of which the individuals of the same species recognize one another. Not infrequently the odoriferous substance has a musky odour; and though the musk of commerce is furnished by the musk-deer, yet the beaver and the civet also yield a musky substance. Similarly, in crocodiles, two pairs of musk-secreting glands are present in both sexes, the odour being especially marked at the pairing season.

Muskhogeans, or CREEKS, one of the great divisions of the N. American Indians, whose domain originally comprised the greater part of the Gulf States east of the Mississippi, and as far north as the Tennessee R. At an early date they were constituted in a powerful political confederacy, the chief members of which were the Muskhogees proper (called Creeks by the whites), the now extinct Alibamus, Apalachi, Koasati, and Yamasi, the Choctaws, Chickasaws, and Seminoles, later (about 1730) joined by the Natchez. Most of the surviving members of the confederacy are now in Indian Territory, where they numbered about 35,000 in 1900.

Muskoka, region, co., and lake of same name, Ontario, Canada, E. of Georgian Bay (Lake Huron). The region covers an area of some 10,000 sq. m., and has extensive forests. It is a popular resort for hunters and anglers. The capital of the county is Bracebridge. Lake Muskoka communicates with Lakes St Joseph and Rosseau, all being navigated by pleasure steamers in summer.

Musk-ox (Ovibos), an Arctic animal which has been regarded as intermediate between sheep and ox. It is now limited to the Arctic parts of the western hemisphere, but once extended throughout the greater part of Europe and over the northern



Musk-ox.

part of Asia. A full-grown adult is about the size of a Highland bull, but, in the hairy muzzle and convex profile, more resembles a sheep. The hair is very thick, and it is so long that it largely conceals the ears and tail, and temp curled on the back, forms there a thick mat, almost like a hump. In the old males the horns have very broad bases, which meet in the middle line, and cover much of the broad forehead. The legs are short and stout, and end in unsymmetrical hoofs, which have hair between them to assist the animals in maintaining their foothold on the ice. Though musk-giands are not known to be present, the flesh is usually, though it would Though musk-glands are tainted with musk. Musk-oxen are social in their habits, the flock being led by an old male, They feed on grass, lichen, moss, and young shoots of willow and pine. One young one is born at à time.

Musk-rat, or Musquash (Fiber zibethieus), a rodent allied to the British vole, but peculiar to America, where it is very widely distributed. It is considerably larger than the vole; the head and body together measure about a foot, and the tail about ten



Musk-rat.

inches. The tail is very characteristic, for it is almost naked, compressed, and scaly, facts which in themselves suggest the aquatic habitat, even apart from the webbed feet. The hair resembles that of the beaver, and is of a dark tint. The body is

massive, without any obvious neck, the eyes and cars small. The secretion from which the animals derive their common name is produced by a large gland found in the groin in both sexes. Though chiefly vegetarian, the musk-rats do not disdain animal food. They live in streams and ponds, and are most active at night, spending the day chiefly in their burrows. In certain localities they build so-called 'winter huts,' which are composed of food material plastered together with mud. Though it is not one of the valuable furs, there is a steady demand for musquash.

Muslin (fabric), probably so called because first made at Mosul in Kurdistan, was first worn in England in 1670, and first made in Europe about 1780 by Robert Monteith of Glasgow, Indian yarn being used. After the improvement of machinery the yarn was manufactured in Europe. Many sorts of muslin are still made in India, both for home use and for exportation: the finest at Dacca; figured and embroidered in Madras (province); silver-printed at Jaipur and Haidarabad. The skill of the Indian weavers is unrivalled.

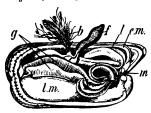
Muspratt, James (1793-1886), Irish chemist, was born in Dublin. Setting up as a chemical manufacturer, he realized in 1823 the value of the Leblane process of manufacturing sodium carbonate, and opened a work at St. Helens in Lancashire. Afterwards, Muspratt, first in Liverpool (1823), then in Widnes and Flint, greatly extended its operation. He must be looked on as the founder of the chief British chemical industry. His son, James Sheridan Muspratt (1821-71), who studied under Graham in Glasgow and London, and under Liebig at Giessen, was distinguished for his chemical investigations, and wrote a Dictionary of Chemistry (1854-60). He founded the Liverpool College of Chemistry (1848).

Musquash. See Musk-rat.
Mussænda, a genus of tropical
herbs and shrubs belonging to
the order Rubiaccæ. They bear
terminal corymbs of mostly
yellow, funnel-shaped flowers.
They are of fairly easy culture
as stove plants.

Mussafia, ADOLF (1835-1905), Romance philologist, was born at Spalato (Dalmatia): taught Italian at the University of Vienna (1855), where he was appointed professor of Romance in 1860. His publications (many of which appeared in the transactions of the Vienna Academy) cover practically the whole field of Romance philology, but perhaps his most important work lies in the departments of Early Italian and

French. Everything that left his hand was marked by ripe scholarship, admirable judgment, and perfect literary taste. Mussel. The common edible

mussel is Mytilus edulis, and is very abundant in suitable localities round the shores of Britain. It thrives best in estuarine waters, where the rivers bring an abundant supply of food, and the waters are sufficiently quiet to minimize the danger of their being swept away in storms. In such places the mussels form huge beds. The young mussels attach themselves by a tuft of threads, known as the byssus, to rocks and so forth, and feeding freely, discharge the waste in the form of fine mud. As this mud accumulates they gradually lengthen their byssus, so as to rise above its surface, until the threads may become several feet in length. Mussels form in many localities an important article of human diet. They are, like oysters—but to an



Structure of Mussel.

g, Gills; b, byssus; l, foot; l, lips; m, mouth; e.m, edge of mantle; l,m, lobe of mantle.

even greater extent-liable to pollution from sewage, and may then be exceedingly dangerous. On the coasts of France mussels are largely cultivated. An enormous number of mussels are also employed in Britain as bait. The larvæ are active and freeswimming. The adults never voluntarily leave the surface to which they have attached themselves, but are capable of spinning a new byssus if forcibly removed. The larger horsemussels (Modiola) are also common round the British coasts. The fresh-water mussels belong to the genera Unio and Anodonta, and occur in lakes and streams in all parts of the world. Many of them produce pearls. Till of them produce pearls. about the end of the 18th century a not inconsiderable pearl fishery was carried on in Scotland, especially in the Tay.

Musselburgh, tn., Midlothian, Scotland, at the mouth of the Esk, on Firth of Forth. It is celebrated for its golfing links, and for the Edinburgh race meeting, held annually since 1817. Loretto School occupies the site of a monastery of that name and a place of pilgrimage. Fisherrow is a fishing suburb, with a

small harbour. Since 1832, with Leith and Portobello, Musselburgh returns one member to Parliament. The industries include paper-making, fishing-net works, brewing, and brick and tile making. Pop. (1901) 11,711.

Musset, ALFRED DE (1810-57). French poet, born at Paris; was from early childhood the pet and darling of the most brilliant social circles. At seventeen he began to write poetry, the quality of which so charmed Victor Hugo, that he invited De Musset to join the Cénacle. De Musset's earliest work was Contes d'Espagne et d'Italie (1830), which took Paris by storm. He next wrote a play, La Nuit Vénitienne (1830), but it had no success. He therefore turned to the written drama, achieving a succès d'estime with his charming pieces, La Coupe et les Lèvres and A quoi rèvent les jeunes Filles, his fine poem Namouna being included in the same volume (1832). His next two works, both dramatic, take rank amongst his greatest, Les Caprices de Marianne and André del Sarto (1833). In these two pieces he plumbed the depths of the deepest tragic passion, while their artistic grace and dramatic power revealed the hand of a master. Rolla (1833), a poem of great but unequal strength, followed; and then came the blight upon his life-viz. his liaison with 'George Sand.' After a short period in Paris they left for Italy, where they soon separated, the poet returning to Paris a soured and disappointed man, with health broken and the fatal vice of intemperance fastening upon him. The story of this melancholy episode is told by George Sand in Elle et Lui. His Confession d'un Enfant du Siècle (1835), one of his greatest works, is a curious mixture of intense earnestness, bitter cynicism, and disbelief in the higher moral virtues. His election to the librarianship of the Home Office concentrated for a time his plans and aims, and he produced in quick succession, La Loi sur la Presse and La Nuit de Décembre (1835), Il ne faut Jurer de rien (1836)—still one of the most popular comedies on the Parisian stage-Un Caprice, and some of the Nouvelles (1839). The last sixteen years of his life were a prolonged struggle with disease. Yet he wrote such masterpieces as his later love poems, also his charming comedy, I' faut qu'une Porte soit ouverte ou fermée (1845), the profoundly melancholy Bettine (1849), and Casmosine (1851). Alfred de Musset takes rank as one of the great lyrical poets of France, his four Nuits alone being enough to enroll him with the immortals,



Meeting between Generals Sir Henry Haveloch, Sir James Outram, and Sir Colin Campbell in the relieved city. Painted by Thomas J. Barher.

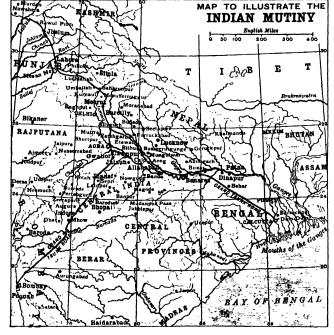
while his Ode à la Malibran and his Rhin Allemand are equally spirited and noble. As a dramatist he was almost as great; while his Nouvelles and Contes contain some of the most ex-quisite pieces in French litera-ture. The best edition of his Euvres is that by Lemerre (1876). See Correspondance de George Sand et d'Alfred de Musset (1904), Spoelberch de Loverjoul's La Véritable Histoire d'Elle et Lui (ed. 1897), and Life of A. de Musset by Paul de Musset (1877), and by Arvede Barine (4th ed.

Mussooree, tn. and sanitarium, Dehra Dun dist., United Provinces, India; stands on the alba and S. nigra, especially the latter, are largely cultivated for the preparation of table mustard. for this purpose the seeds are finely ground, the product ob-tained being separated by sifting into mustard flour and diessings. After a second sifting the purified flour is as a rule diluted with wheat flour and coloured with turmeric. Such admixture is usually made openly, though adulteration with objectionable diluents and colouring matters is not uncommon. The dressings from the preparation of mustard on expression yield a non-drying fixed oil of the glyceride type, which must, however, not be confounded with the true mustaid

Mustelidæ, a family of carnivores belonging to the bear section, and including (1) the otters, (2) the skunks, and (3) the weasels and their numerous allies, such as the martens, stoats, and polecats.

Mutanabbi. See Motanabbi. Mute. See Violin.

Mutina. See MODENA.
Mutiny. INDIAN, was in reality
a military revolt. There was
general unrest all over India,
and a feeling of uneasiness with regard to the future policy of the government. Our disasters in the Afghan and Crimean wars had damaged our reputation; our conduct in Sindh and Burma had caused irritation; our military system was old-fashioned and stern. The adoption of greased cartridges, an outrage upon the religious sentiments of the Hindus, furnished an opportunity for the outbreak of the mutiny. The the outbreak of the mutiny. movement was mainly confined to Oudh and the North-west Province. On March 29, 1857, the first outbreak occurred at Barrackpur, and the native mutineers then seized Delhi, setting up as their leader the old king of Delhi. Sir George Grey, the governor of the Cape, realized the gravity of the situation, and sent to India troops then on their way to China. Outram and Havelock opportunely arrived from Persia, and Lord Elgin, on his way to China, sent all the troops with him to Cal-cutta. The British at once be-sieged Delhi, and held the Ganges between Calcutta and Benares. At Cawnpur the English garrison, with many women and children. was massacred; but the defence of Lucknow was successful. In September 1857 Lucknow was relieved by Havelock, and again in November by Colin Campbell. Delhi was in September captured, and the sons of the old king (who was spared) were shot by order of Hodson of Hodson's Horse, Early in 1858, Lucknow and the other chief strategic points having been recovered by the British troops, the rebellion came to an end. The failure of the mutiny was due to the want of a good leader, to the opposition of interests among the rebels, to the loyalty of the Sikhs, of the Ghurkas, of Sindhia, and of Holkar, and to the British spirit. The result of the mutiny was the transference to the crown of the powers of the East India Company. See Lyall's British Dominion in India (ed. 1894); Kaye and Malleson's Sepoy War (1864-76); Hunter's British India (1900); Holmes's History of the Indian Muliny (1898). The Indian Martiny (1898). Mutiny (1898); The Indian Mutiny, ed. Forrest (1903); Forbes's Havelock (1897); Cunningham's Canning (1890); and Fitchett's Tale of the Great Mutiny.



lower Himalayas, 78 m. E. of Ambala. With Landaur it forms a convalescent station for European troops. The town suffered from a severe earthquake in April 1905. Pop. (1901) 4,741. Mussulman. See MOHAMME-

DANISM.

Mustang, the wild horse of the American prairies, descended from the horses imported by the Spaniards which had reverted to

a feral state. See HORSE.

Mustard (Sinapis alba), as a salading plant, is commonly cultivated in connection with common cress. As the seeds germinate more quickly than those of the cress, they should be sown about three days later. Both S.

oil, allyl isothiocyanate, obtained by distillation of the seeds with water. Mustard was used as a condiment by the Anglo-Saxons, and in Norman times was commonly used in mixture with honey.

wine, and vinegar.

Mustard Oil, or ALLYL ISOTHIOCYANATE, SCNC₃H₅, is present as a glucoside in the seeds of black mustard, from which it is obtained by boiling with water, or by the action of a ferment, myrosin, also present. It may be obtained synthetically by the action of potassium thiocyanate on allyl iodide, and is a pale yellow, pungent-smelling oil (sp. gr. 1017, b.p. 150'7° c.) that blisters the skin.

Mutiny Act. A bill for the punishment of mutineers and deserters, which was introduced in 1689, is known as the first Mutiny Act. Mutiny and desertion were made punishable by death, and the assembly of courtsmartial authorized; and it was further provided that the bill should not interfere with the civil law or extend to the militia. The duration of the Mutiny Act thus made was limited to seven months, but with few intermissions it has since been renewed annually up to 1878. In conjunction with the Mutiny Act the army was ruled for many years by the Articles of War issued under royal prerogative; but this privilege of the crown was replaced in 1803 by a statutory power in accordance with the act. Finally the act and the articles were consolidated in the Army Act of 1881.

Mutisia, a genus of S. American shrubs belonging to the order Compositæ. Some are hardy, whilst other species require the protection of glass and artificial

heat.

Mutsuhito, emperor of Japan.

See MIKADO.

Muttra, or MATHURA, munic. tn., Muttra dist., United Provinces, India, on r. bk. of Junna, 30 m. N.W. of Agra. It was once the centre of the Buddhist faith, and is the reputed birthplace of Krishna and his brother Balarama, and consequently a great pilgrim resort. Pop. (1901) 60,042. The district has an area of 1,441 sq. m. Pop. (1901) 763,099.

Muyscas. See Chibchas. Muzaffargarh, dist., Punjab, India, with area of 3,422 sq. m. and population (1901) of 405,743. A portion of the district is irrigated. The chief town, of the same name, stands near r. bk. of Chenab, 20 m. s.w. of Multan.

Muzaffarnagar, munic. tu. and cap. of dist. of same name, United Provinces, India, 80 m. N.E. of Delhi. Pop. (1901) 23,444. The district has an area of 1,656 sq. m. Pop. (1901) 877,984.

Muzaffarpur, chief tn. of district of same name, Bengal, India, on r. bk. of Little Gandak, 37 m. N.E. of Patna. Pop. (1901) 45,617. The district, which has an area of 3,003 sq. m. and a population (1901) of 2,754,790, yields most of the saltpetre of Bengal.

Muztagh-ata, mountain mass, loftiest in Pamirs, the culminating point in Mustagh or Ice range, and considered holy by the Kirghiz, lies 105 m. s.w. of Kashgar: alt. 25,500 ft. It was ascended in part by Sven Hedin in 1894.

M.V.O., Member of the Royal Victorian Order.

Mweru, or Moero, lake, Central Africa, 90 m s.w. of Lake Tanganyika, 76 m. long and 25 m. broad. It is traversed by the Luapula, or Upper Congo. The Luapula, or Upper Congo. The lake was reached by Livingstone in 1867, and its shores explored

by Sharpe in 1890.

Myall Wood, the hard wood of the Australian tree Acacia pendula. It has a pleasant fragrance, somewhat reminiscent of violets, and is much used for making tobacco pipes, though polishing destroys the natural scent. The wood of A. homalophylla is similarly used. The wood of A. acuminata resembles these in appearance, but has a fragrance like that of raspberries. The socalled bastard myall, often used for whip-handles, is the wood of A. falcata.

Myaung - Mya, dist., Lower Burma, has an area of 3,005 sq. The chief town is Pantenaw.

Pop. (1901) 303,274.

Mycale, mountain on W. coast of Asia Minor, opposite Samos. Near it the allied Greeks, under the Spartan king Leotychides, destroyed the Persian fleet and army on the same day as that on which the battle of Platzea was fought, in 479 B.C. Its modern name is Samsun Dagh.

Mycelium, the vegetative mass which constitutes the bulk of the majority of fungi. It is usually composed of numerous interwoven tubes or hyphæ, which branch in all directions, the branches of adjacent tubes joining together into

an irregular web.

Mycenæ, tn., Argolis, ancient Greece, at N. extremity of plain of Argos. It is said to have been founded by Perseus. It was the chief city of the Pelopid dynasty, and is especially famous in Homer as the city of Agamemnon. The excavations undertaken by Dr. Schliemann in 1876, and continued in 1877 by the Greek Archaelogical Society, fully justify Homer's epithet, 'Mycenæ, rich in gold.' The citadel stands on a rock surrounded by a gorge and massive cyclopean walls. These are of a more recent date than those at Tiryns. The most remarkable remains are the passage and Lion Gate (10) ft. high, 102 ft. wide below, and 92 ft. above) leading to the citadel; on the lintel stand two lions facing each other. Within the gate is a sort of circular tunnel, the exact purpose of which is unknown, except that it enclosed the royal tombs. The whole hill is covered with buildings; on the summit the ground-plan of an ancient palace has been brought to light. Outside the citadel the most interesting ruins are the so-called beehive tombs, the most striking heing the Treasury of Atreus. A passage 38 yds. long and 19 ft. wide, the sides of which are supported by solid walls, leads to a door (171 ft. high, 81 ft. wide at the base, and 8 ft. at the top); its lintel is formed of two block of stone, the inner one nearly 30 ft. long, 16 ft. broad, and 3 ft. thick. The chamber of the tomb is of the shape of a beehive, about 50 ft. in diameter, and the same in height. Off this chamber a door opens into the tomb proper, about 12 ft. by 6 ft. See MYCE-NÆAN CIVILIZATION.

Mycenæan Civilization ex-

isted in Greece at some prehistoric period, and extended over the islands of the Ægean sea, the Troad in Asia Minor, Crete, and perhaps even parts of Sicily and Italy. The principal excavations have been made at Mycena and Tiryns in Argolis; Amyclæ in Laconia; at Acharnæ, Eleusis, Thoricus, and Athens in Attica; at Orchomenus and Glain Bœotia; at Pagasæ in Thessaly; at Delphi; in the islands of Melos and Thera; at Troy; and at Cnossus, Phæstus, and other places in Crete. The character of the finds in these widely-separated sites is markedly uniform. The walls are of the kind called cyclopean -i.e. composed of huge blocks of stone accurately fitted without the use of mortar; in the more advanced style of the period the blocks are hewn, and are of a quadrangular form. Rock-cut tombs and those of a peculiar bechive shape also characterize the architecture of the period. At Tiryns, Mycenæ, Troy, and Cnossus the remains of huge and imposing palaces, and at some places—above all at Mycenæ—great stores of golden ornaments have been found, together with implements, both weapons and domestic utensils, of bronze, and great quanti-ties of pottery. The pottery is highly glazed, usually of a red-dish colour, and ornamented with figures of vegetables, men, and animals. Many of the vessels are animals. of beautiful and artistic shapes. At Tiryns, and at Cnossus more especially, remains have been found of wall-paintings, which illustrate the life, dress, and manners of the period to a remarkable degree. There are also some works in sculpture of great excellence. These remains indicate that the Mycenean civilization was highly advanced. Amongst the archæological treasures found at Mycenæ are pieces of porcelain inscribed with the name of Amenhotep III. of Egypt, and a scarab with his wife's name. The date of Amenhotep is about 1400 B.C.; and as Mycenean pottery is represented in a painting at Thebes in Egypt dating about the same time, and vases of Mycenæan make have been unearthed at Gurob in the Fayûm, a city which only existed from about 1500-1200 B.C., that may be taken as the period at which this civi-

lization was at its height. It is evident, therefore, that the Mycensean civilization was older than that described by Homer, though but little older. Homer and all Greek legend imply that the original rulers of Mycenæ had just been superseded by men of a newer race, called Achæans; and in many points the Achæan civilization did differ from the Mycenæan. The following points need especial notice: the Mycenseans buried, the Achseans burned, their dead; the Mycenæans used only bronze weaponsthe Achæans were beginning to use iron; the Mycenæan offensive weapons were regularly bow, arrow, and sword, and for picked men the spear, with an oblong shield—the Achaan were spear, sword, and round shield, with breastplate and greaves besides, the bow being despised; the My-censeans were their hair tied up in knots on their heads, while the Achæans wore theirs flowing loose. Now the traditional date of the capture of Troy is 1184 B.C., and of Homer some hundred years later; these dates synchronize well with the archæological evidence. Homer indicates that the Achæan immigrations into Greece, while making an advance in military tactics and weapons. and introducing new religious rites and beliefs—as the change from burial to cremation proves-did not violently overthrow the Mycenæan civilization. Thus the Homeric picture of society is a fair representation of that in Mycenaan days. The great palaces of Tiryns, Mycenæ, Amyclæ, and other places were destroyed by the succeeding Dorian invaders. As in many parts of Greece, notably Arcadia and Attica, the original inhabitants were never dispossessed, the Mycenaan race (if the term may be used) was as truly Greek as the Arcadians and Athenians. Their civilization reached its height, not in Attica, but in Argolis, Crete, and the Troad. Hence it may be argued that the later civilization of Greece was only a development or a renaissance of the Mycenæan. The language was Greek, in an earlier form. The skeletons and skulls discovered in the tombs show that the people were dolicho-cephalic, dark-haired, and darkcomplexioned, and a comparatively small race—in fact, similar to the mass of the Greek population at every period. The views above stated are not accepted by all authorities, but a fuller treatment of the question will be found in Schliemann's Mycenæ (1878), Ithaca (1879), Orchomenos (1881). and Tiryns (1886); Schuckhardt's Schliemann's Excavations (1891); Dörpfeld's Troja (1893); Tsuntas and Manatt's The Mucenean

Age (1897); Perrot and Chipiez's Histoire de l'Art, vol. vi. (1895); Myres's 'Prehistoric Man in the Eastern Mediterranean,' in Science Proyress (1896 and 1898); Frazer's Pausanias (1900); H. R. Hall's Mycenean Age (1901); and Ridgeway's Earty Age of Greece (1901).

Mycetozoa, a group of funguslike organisms. There are about 300 known species, most of them included in the division of Myxo-

mycetes, or slime fungi.

Mydriasis, in medicine, an unnatural condition of the eye, in which the pupil remains permanently dilated, or only contracts very slowly and partially under the stimulus of light. It occurs in the course of certain diseases, and may be produced by some drugs—e.g. belladonna and its derivatives.

Myclitis, inflammation of the spinal cord. It may be acute or chronic, and its symptoms vary with the part of the spinal cord inflamed. It may follow various infective diseases or fevers, or be the result of injury. Any marked loss of muscular power or of sensation may be caused by myelitis. One form is the cause of infantile paralysis. Treatment varies according to the first cause; but nerve tonics are sometimes used, while electricity is of great service both for diagnosis and treatment.

Myers, ERNEST JAMES (1844), English poet, was born at Keswick, Cumberland, brother of Frederick Myers. He was classical lecturer at Wadham and Balliol Colleges, Oxford. He has issued Poems (1877 and 1904), The Defence of Rome (1880), The Judgment of Prometheus (1886), and The Puritan (1869). His work is marked by imagination, metrical skill, and noble feeling.

Myers, FERDERICK WILLIAM HENRY (1843-1901), English poet and essayist, born at Keswick, Cumberland. He became fellow of Trinity College, Cambridge (1865), and government school inspector (1872). Up to 1882 he devoted himself mainly to poetry and essay-writing; after that to the study of spiritualism and mesmerism; and he was one of the founders of the Society of Psychical Research. He wrote St. Paul (1867), and two volumes of shorter poems; Essays, Modern and Classical (1885); Life of Wordsworth (English Men of Letters, 1881); Human Personality and its Survival of Bodily Death (1901).

Mygale. See BIRD-CATCHING SPIDER.

Myingyan, dist., Meiktila div., Upper Burma, on E. side of Irawadi valley. Lacquer ware is manufactured. Area. 3,139 sq. m. Pop. (1901) 356,052. Myitkyina, dist., Mandalay div., Upper Burma. Area, 10,640 sq. m.; pop. (1901) 67,399. The chief town is Myitkyina, the limit of navigation of the Irawadi.

Mylæ. See MILAZZO.

Mylitta, in Babylonian and Assyrian mythology, the goddess of beauty, carnal love, and fruitfulness, corresponding in some degree to the Roman Venus.

Mylne, ROBERT (1734-1811),

Myine, Robert (1734-1811), Scottish architect and engineer, born in Edinburgh, and settled in London. Among the works he designed or constructed were Blackfriars Bridge (1760-9) and the Gloucester and Berkeley Canal. He was also surveyor to St. Paul's Cathedral, and engineer to the New River Company.

to the New River Company.

Mylne, ROBERT WILLIAM
(1817-90), son of William Chadwell, was an architect, engineer,
and geologist, and assistant to his
father for twenty years. His
principal work was the providing
a water-supply for one of the
sunk forts off Spithcad. He wrote
several works on artesian wells
and the geology of London

several works on artesian wells and the geology of London.

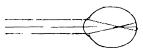
Mylne, WILLIAM CHADWELL
(1781-1863), Scottish engineer and architect, son of Robert Mylne; became in 1811 engineer to the New River Company. In 1813 he made surveys of the Thames and Portsmouth harbour; in 1821 he designed and executed waterworks for Lichfield, and in 1836 for Stamford, Lincolnshire. He was extensively engaged in drainage and engineering operations, especially in the Fen country.

Mylodon, a large extinct sloth, closely allied to those at present living in S. America and to the Megatherium. Most specimens have come from the Pleistocene of S. America, but allied species have been found in N. America. Unlike the Megatherium, it had a rudimentary dermal armour of bony plates.

Myna, or Mina (Eulabes religiosa), an Indian bird belonging to the starling family (Sturnidæ). It is black in colour, with purple and green iridescence, and bears a white patch on the wing-quills. Like the British starling, it possesses considerable powers of imitation, and can be taught to speak. The name myna, or myna bird, is also applied to some other Indian birds of the same family.

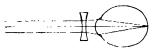
Mynster, Jakob Peder (1775–1854), Danish theologian, was made bishop of Sjælland (Zealand) in 1834. An energetic, eloquent prelate, whose sermons refilled the churches emptied by the rationalistic preachers, he exercised immense influence on younger clergy, although his ultra-conservatism opposed many reforms. He wrote an Autobiography (1854). See Life, in Danish, by Schwanenfügel (1900-1).

Myopia, or Short-sight, a defect of vision due to structural abnormalities in the eye. Should the corneal surface of the eye and the crystalline lens be too convex, parallel rays are brought



Parattel Rays entering Myopic Eye.

to a focus in front of the retina: and the same result ensues when the antero-posterior axis of the eyeball is too long. In each case a blurred image is thrown upon



Rays entering Myopic Eye through a Concave Lens.

the retina. But a concave lens of suitable strength placed before the myopic eye will focus the rays of light on the retina. The converse holds good in hypermetropia. Both myopia and hypermetropia, ought to be corrected by suitable spectacles.

Myoporum, a genus of tropical subtropical shrubs belonging to the order Myoporinaceæ. Some of the species are occasionally grown as greenhouse plants. thriving in a peaty soil. All the species are white-flowered.

Myosin, an albuminoid occurring in muscle. It is obtained by grinding up well-washed, finely-minced fresh meat with salt, adding a little water, and squeezing through a filter into water, when a white precipitate is obtained which dries to a horny mass. It is soluble in sait solution and dilute alkalis, is coagulated by heat, and converted by acids into syntonin.

Myosis, in medicine, a condition of the eye in which the pupil is unnaturally contracted, and slow to expand under ordinary conditions. It can be produced by the application of certain drugs-e.g. opium and its alkaloids.

Myosotis. See Forget-ME-

Myrcia, a genus of tropical American trees and shrubs belonging to the order Myrtaceæ. They bear axillary peduncles of small flowers. The only species occasionally seen in cultivation is the fine shrub M. amplexicaulis, which bears long sessile leaves and downy panicles of white flowers. It grows in stove heat in a light, sandy, peaty compost. Myrica, a genus of shrub con-stituting the order Myricaceæ.

Most of the species are aromatic. The flowers are unisexual, and are borne in catkins. The fruit is a drupe, and the leaves are usually evergreen. The most usually evergreen. suitable soil for their culture is a peaty loam. M. cerifera, the common candleberry myrtle, is a hardy shrub bearing reddish flowers in spring; M. Gale, the sweet gale, is a native of Britain, and is a deciduous shrub bearing brownish-green flowers in early spring; and M. Nagi is a greenhouse shrub bearing edible reddish fruit.

Myriopoda, a class of airbreathing arthropods which resemble insects in breathing by tracheal tubes, and in bearing one pair of antennæ on the head, but differ in possessing a worm-like body, not divided into re-gions, and in the fact that both the appendages and the segments which hear them are numerous, and singularly uniform in structure. In the absence of wings they resemble such primitive insects as the springtails. Indeed, insects and myriopods must have arisen from a common stock. Most myriopods live in dark and concealed situations. stock. They are more numerous and reach a greater size in warm countries than in cold ones, but are widely distributed over the globe. The vast majority are terrestrial; but a few centipedes live on the seashore, and can tolerate submergence for many As to appendages, the head, in addition to the antennæ.



Myriopods. 1, Centipede; 2, millipede.

bears a pair of mandibles, and one or two pairs of maxillæ, or jaws. The legs are numerous and similar, save that in centipedes the first pair forms poison claws. The internal anatomy is very similar to that of insects. The two classes into which myriopods are divided are the centipedes, or Chilopoda, and the millipedes, or Chilognatha. The former are carnivorous and poisonous, with flattened bodies, and have only one pair of appendages to each segment; the latter are harmless and vegetarian, with rounded bodies, and apparently two pairs of appendages to each segment.

Myrmecophaga. See ANT-EATER.

Myrmidones, an ancient Greek trile who dwelt in Phthiotis in Thessaly. They were the soldiers whom Achilles led to the Trojan war. Their obedience the Trojan war. Their obedience to their leader has caused their name to be used as the designa-tion of 'a devoted and unquestioning or unscrupulous fol-lower (myrmidon).

Myrobalan Plum, or BEDDA NUT, names sometimes given to Prunus cerasifera, a hardy tree or shrub with unarmed branches, and with obovate leaves, glabrous beneath. It bears solitary or nearly solitary white flowers in spring, and these are followed by red, globose, yellow-fleshed fruits.

Myron, Greek sculptor, was a native of Eleutheræ in Bootia. He was born about 480 B.C., and was a younger contemporary of Phidias. His professional career was followed at Athens. He was most famous for his bronzes; perhaps the most celebrated were his Cow (on which there are thirtysix epigrams in the Greek Anthology) and his Discobolus, or quoitthrower.

Myronides, an Athenian general who defeated the Corin-thians in Megaris in 457 B.C., and the Bœotians at (Enophyta in 456-a victory which made Bootia dependent on Athens.

Myrrhis, a genus of hardy herbaceous plants belonging to the order Umbellifere. The sweet cicely, or myrrh (M. odorata), is a native of Britain. It bears compound umbels of white flowers, and has a distinct fragrance. It was formerly much grown as a pot herb.

Myrsiphyllum, a genus of deciduous twining plants belonging to the order Liliaceae. They are natives of S. Africa, and require greenhouse cultivation in Britain.

Myrtacese, a natural order of mostly tropical trees and shrubs. Among the genera are Myrtus, Hypocalymma, Melaleuca, Darwinia, and Leptospermum.

Myrtle, or MYRTUS, a genus of hardy and tender shrubs belonging to the order Myrtaceae. In many cases the leaves and flowers are markedly fragrant. The soil required for their cultivation is a light vegetable compost. The best-known species is the common nyrtle (M. communis), a native of S. Europe, parts of Britain. It bears white flowers in summer.

Mysia, in ancient geography the N.W. corner of Asia Minor, between the Propontis (Sea of Marmora) on the N. and the Ægean Sea on the W. The Mysi were a Thracian people who migrated into Asia; Homer mentions them as allies of the Trojans. Mysia was ruled successively by the Persians, by the kings of Pergamus from 280 B.C., and by the Romans from 133 B.C.

Mysis, a genus of schizopod crustaceans, including many British species, which are small, shrimplike creatures, found in the sea, but also extending into brackish or even into fresh water.

Myslowitz, tn., prov. Silesia, Prussia, 110 m. s.E. of Breslau, and on frontier of Poland. Among its industries are coal-mining, zinc-refining, and flax-spinning. Pop. (1900) 13,358.

Mysore, or Maisur. (1.) Native state of Madras Presidency, India, has an area of 27,936 sq. m. It is intersected by spurs of the W. Ghats and by the Nilgiris; but the greater part of the country is undulating. principal rivers are the Kistna (Krishna) and the Cauvery. Large reservoirs are formed by embankments, and the Salukere lake has a circumference of 40 m. Gold is mined and iron smelted. The principal products are cinchona, spices, rice, oil-seed, cotton, sugar, coffee, and salt; European fruit and vegetables are grown at Bangalore. Sandalwood is a state monopoly. The chief manufac-tures are jewellery, carpets, blankets, cotton and silk cloths. The state was under British administration from 1831 to 1881. Trop. (1901) 5,538,482 -2,796,165 males, 2,742,317 females, (2,) Capital of above state, India, 10 m. s.w. of Seringapatam, is a well-built place, with the ma-harajah's palace and the resi-dency. It manufactures carpets. dency. It manufa Pop. (1901) 68,111,

Mystagogue, an important functionary in the celebration of the Eleusinian mysteries. These officials were men who had passed through all grades of initiation, and were licensed by the state. To candidates for initiation they had to give in-struction as to the various purifications and ceremonies.

Mysteries, in ancient Greece. See ELEUSINIA.

Mysteries. See MIRACLE

PLAY. Mysticism, in religion and philosophy, meant the doctrine that God cannot be rightly apprehended by any ordinary process of knowledge, but only by an immediate intuition that transcends knowledge - an ecstatic vision or communion in which man becomes one with the divine Being. Mysticism found its first noteworthy philosophical expression in the Neo-Platonic philosophy (see NEO-PLATONISM) of the 3rd century A.D., although similar ideas had already been set forth by Philo of Alexandria in the 1st century, and in fact pervaded the philosophicoreligious thought of the time. The Neo-Platonic term for that intuition in which the soul is united with God was 'ecstasy,'

and this ecstasy was conceived as the final stage in an ascent of the soul from the life of sense-a stage, however, that was seldom achieved, and was with difficulty maintained. Mysticism as a tendency, both philosophical and religious, was revived in the middle ages, when it operated as a complement to or counteractive of scholasticism. It appeared in Scotus Erigena, a philosopher of the 9th century, whose teaching was much influenced by certain writwhich, though attributed ings, which, though attributed to Dionysius the Areopagite, really belonged to a much later date, and which contained a large infusion of Neo-Platonism. A philosophical mysticism like Erigena's, which embraced not only a doctrine of mystical union with God, but a speculative system of the universe, was re-garded with suspicion and hostility by the ecclesiastical authorities. The close of the scholastic period, like its beginning, was signalized by the appearance of a mysticism of the more speculative type in the teaching of Eck-hart, under whose influence there developed a German school of mysticism which became religious rather than philosophical. of the writings which issued from this school, and which is known as The German Theology, was greatly esteemed by Luther.
Another name of considerable

importance in the history of mysticism is connected with the transition period between scholasticism and modern philosophy-that of Jacob Boehme. His doctrine was a mixture of the current halfmagical, half-metaphysical conception of nature with the traditional Neo-Platonic mysticism. Of no great philosophical importance in itself, it nevertheless exercised some influence so late in the history of modern philosophy as the time of the post-Kantian German idealists, some of whom were specially attracted by his idea that the opposition of good and evil must have its deep roots in the being of God Himself. The mystical writings of William Law, the author of the Serious Call, illustrate the religious influence of Boehme. In modern philosophy proper the mystical tendency has by no means been absent, but in no philosopher of eminence has it been so prominent that he can be characterized as a mystic simply.

The defect inseparable from mysticism throughout all its history is that it will not accept the revelation of God that comes in the ordinary experiences of hu-man life and in history, but will have a revelation of its own apart from and above these. 'In the ascent to the divine unity the mystic loses hold of everything by which he could positively characterize it; and when he arrives at it, it is with empty hands' (E. Caird's Evolution of Theology in the Greek Philosophers, 1904, vol. ii. p. 215).

Mytens, or MEYTENS, DANIEL (c. 1590-1642), Dutch portrait painter, born at the Hague; established a reputation in England, and became painter to Charles I. Most of the great court personages sat to him. His work is dignified and conscientious, but stiff. Overmatched by his friend Van Dyck, he returned to Holland (1630)

Mytho, or MITO, tn., Cochin-China, French Indo-China, on 1. bk, of N. arm of Mekong, 23 m. from the sea, and 58 m. by rail

s.w. of Saigon. Pop. 22,600.

Mythology is the scientific investigation of traditional beliefs; also the aggregation of such beliefs or myths. In this latter sense mythology embodies the historical elements of primitive religion as distinguished from its Further, it includes a ethics. mass of heterogeneous ideas that may be classified as hero-worship and distorted history, national and individual. The origin of the cosmos forms the basis of all but the lowest mythologies. The traditions of Shintoism speak of a time when heaven and carth were not separate, but formed one common indefinable mass, out of which gods and men were gradually evolved. Some Red Indian tribes, while recognizing an always-existing Creator, look back to a period when there was no land. Neither of these differs greatly from the Mosaic account. In the awful roll of the thunder the primitive mind would naturally hear the voice of a Jupiter Tonans, and would see in the lightning the gleam of thunderbolts launched by his mighty hand. The sight of an active volcano might easily give rise, especially among a metal-using people, to the fancy that a superhuman smith was working at some vast subterranean forge; and the shuddering of an earth-quake would suggest a 'giant quake would suggest a 'giant pulsing under ground.' Nor is it difficult to understand how death would become personified as Pallida Mors. The Greek conception of death (Thanatos) as the brother of sleep (Hypnos) is equally intelligible, whether he is pictured as the kindly friend who comes to relieve man from the troubles of life, or as the armed foe whom none can resist. This anthropo-morphic instinct has produced many of the figures of mythology out of intangible natural forces. A further step is taken when such personages, having become long familiar to the popular mind, are accredited with human passions and prejudices, and are made, in

many instances, to perform actions which are far from noble, not to

say divine.

But while the forces of nature have, by one mental process, become thus individualized, other mythological figures have been produced by the working of a converse tendency. There is reason, that is to say, for believing that many so-called supernatural being the converse of the conve ings have their originals in real people, whose actual characteristics, good or bad, have become much exaggerated in the course of a long stretch of time. This theory appears to have been first broached in the 4th century B.C. by a Greek philosopher named Euhemerus. The doctrine of euhemerism has recently been ably applied by Miss Jane Harrison in considering the centaurs of Greek tradition. 'Homer (Iliad i. 262) knew quite well who the opponents of Peirithoös were; not cloud-demons, not mountain torrents, but real wild men (*Pheres*), as real as the foes they fought with.' In brief, this writer endorses the verdict of Nonnus. The centaurs are of the blood of the shaggy satyrs,' and under this latter name she recognizes the Satræ, a Thracian people. In either instance an actual race

possibly one and the same race -has gradually become transformed into something unreal and mythological.

In fact, the mythopœic tendency is a living and active process. In his collection of the legends of the Absahrokee or Crow In-dians of Montana, Mr. S. C. Simms (of the Field Columbian Museum, Chicago) includes the following:—'Long time ago there lived a very dwarfish people who dwelt in cliffs and had no fire. Their bows were made of deer antlers, and their arrow-heads were of flint. They were so powerful that they could carry buffalo on their backs... For many years past it has been the custom of the Indians passing to shoot arrows in this ledge [the abode of the dwarfs], and with each arrow shot a prayer was made that the person may be as strong as the dwarf people, and that his aim may be as true and unerring as theirs.' If this tradition were taken by itself, it would be possible to assign to it a purely mythological origin. But, in addition to this Dakota legend, there is that of the Algonquin remnant still inhabiting Maine and Nova Scotia, which asserts that the aborigines of that region were 'little men, dwellers in rocks.' Now this is simply a historical truth; for the 11th - century Norsemen who invaded that territory found the natives to be a dwarfish people living in caves and underground dens. As is well known, the Red Indians had not then reached the Atlantic seaboard. Thus these three accounts—Norse, Algonquin, and Dakotan—point to a former North American race, represented in some measure, if not altogether, by the Eskimos, who even yet have not given up the use of flintheaded arrows. By extending the area under consideration, this realistic interpretation is still further strengthened. Thus, Captain Meadows Taylor states that the cromlechs of the Deccan in India are locally believed to be the work of 'a dwarf race of great strength, who inhabited the country in very remote ages.' This tradition he justly compares with the similar legends attaching to the cromlechs of Brittany, where 'as strong as a dwarf' is still a proverbial saying. A like account lingers in Scotland of a dwarfish people who were good bowmen, slaying men of large size and powerful make by their dexterity in the use of the bow and arrow.' Only the euhemeristic interpretation can satisfac-torily explain such traditions as these, and the deduction drawn by this method is, in this example, confirmed by the results of ethnological research. The study of mythology may therefore be followed along two main lines, although minor problems emerge at various points. See the articles Ancestor Worship, Animal Worship, Animism, Nature WORSHIP, SOLAR MYTH, and To-TEMISM.

The leading mythological systems may be summarized under Semitic, Indian, Egyptian, Græco-Roman, and Northern Mythol-

ogies.

SEMITIC MYTHOLOGY. - Apart from the information afforded by the Jewish Scriptures, which represent one phase of this question, the mythology of the Semites can best be studied in ancient Baby-lonia and Chaldea, the earliest seat of the religion common to Hebrews, Chaldwans, and Baby-lonians. To some extent this religion is derived from the non-Semitic and probably Turanian races of the Akkadians and Sumerians, whose ideas were paramount in Babylonia until about the year 2500 B.C., when the Semites finally gained the ascendancy. Thus, the trinity worshipped by the Babylonians under the names of Anu, Bel, and Ea or Hea, had been known previously to the Sumerians as Anna-Enlil-Enki. The chief temple of the god Anu was in the city of Erech; special reverence was paid to Bel in the city of Nippur; while Eridu, on the Persian Gulf, was peculiarly as-sociated with the worship of Hea, the third person of the trinity. But the source of the trinity it-

self, and immeasurably supreme above it, was the one eternal God, known to the Akkadians as Dingira, and to the Semites as Ilu, from which latter name comes Bah-Ilu, 'the Gate of Ilu,' otherwise Babylon. It is an interest-ing feature of this religion, as of those of other high civilizations, that the existence of a Great that the existence of a First Cause' was fully recognized. It is doubtful, however, whether this conception preceded the nature worship which predominates in Babylonian religion, for be-neath Ilu and his subordinate trinity were many deities, male and female. There was another and female. triad, consisting of the Moon-god (Sin), the Sun-god (Shamash), and the God of the Atmosphere (Ramman). Moreover, as in Egypt, each town and district had its local god. The tutelary god of Babylon was Marduk, a Semitic adaptation of the Akkadian Amarutuki, 'the Light of the Sun.' With the growth of Babylon the cult of this Marduk, or Merodach, increased enormously, and his position in the pantheon under the composite aspect of Bel-Merodach became almost supreme. See Lenormant's Chaldean Magic (Eng. trans. 1877); E. G. King's Akkadian Genesis (1888), and his Asaph Psalms (1890); Sayce's Religion of the Ancient Babylonians (1898); Brown's Semitic Influence in Hellenic Mythology (1898); and L. W. King's Babylonian Religion (1899).

INDIAN MYTHOLOGY. - The opinion of Charles Coleman (Mythology of the Hindus, 1832), that the ancient religious beliefs of India are derived from Chaldaa, is at least partially incontrovertis at least partially incontrovertible. Dr. Gustav Oppert points out, however (Original Inhabitants of India, 1893, p. 398 et seq.), that the mythology of the Aryan involves of India. invaders of India was appreciably affected by that of the Dravidian aborigines. The Hindu theogony may be thus briefly outlined:-The supreme god was Varuna, and subsidiary to him was the trinity, consisting of Surya (the sun), Agni (the god of fire), and Indra (the god of the atmosphere), who was also one with Vayu (the god of the winds). Vishnu, also a solar deity, represented Indra in his character of the preserver. In the worship of Agni by the Hindus, the sacred fire is pro-duced by the friction of two sticks; evidence that this is a very ancient fire cult. Agni, now resident on earth, is regarded as the first priest, or rashai, interceding with the gods on behalf of men, and protecting them from the evil rakshasas or demons. (For fuller information, see article VEDA.) Later the Hindu trinity, or Trimurti, consisted of Brahma, Vishnu, and Siva. Ulti-

mately these two last became the chief objects of Hindu worship-Vishnu, in his eighth avatar, having been incarnated as Krishna, or Chrishna. Siva is chiefly worshipped under the symbol of the Linga (see PHALLICISM). Brahmanism, in its purity, stands midway between early Hindu mythology and the creed of the worshippers of Siva. Buddhism, which had its origin in the 5th century B.C., rejects altogether the grosser elements of Hinduism, and is a high and spiritual religion. See Barth's Religions of India (Eng. trans. 1882); Monier Williams's Brahmanism 1887), and his Indian Wisdom 1893); Davis's Sankhya Kārikā 1894); Rhys Davids's Buddhism ed. 1896); Oldenberg's Buddha ed. 1898); Grünwedel's Mytholo-gie des Buddhismus (1901); and P. N. Sinna's Bhagavata Purana (1901).

EGYPTIAN MYTHOLOGY owes much to the earlier systems of Chaldæa and Babylonia. At first a pure monotheism, recognizing only one eternal and invisible Spirit, the Creator of all things, the religion of ancient Egypt gradually sank into polytheism. The Eternal became symbolized by the sun, afterwards personified as Osiris. From this anthropomorphic conception there resulted the idea of a female consort-Isis, the symbol of æther; and from them proceeded Horus, or Orus, the third person of the trinity. According to Plutarch, Horus was the first production of the power of Osiris, the model or plan by which he produced every plan by which he produced everything, or the archetype of the world.' This Egyptian trinity is essentially one with those of the Hindu and Semitic mythologies, all probably owning a common origin. Some of the divine figures painted by mediæval artists are obviously derived from this source. Isis suckling her baby son Horus, the infant Krishna in the arms of his mother Devaki, and the Madonna and Child of the Italian painters cannot be dissociated from one another, and the nimbus round the heads of the figures points to the solar character of their originals. (In this connection see Adams's Book of the Master, 1898.) Many of the divinities of ancient Egypt also connote those of the Græco-Ro-man pantheon; and Juno, Mi-nerva, Diana, Proserpine, Venus, Ceres, and Hecate are merely various presentations of The manifold aspects of later Egyptian mythology cannot be here cited in detail. The cult of Serapis was the outcome of the worship of the bull Apis, believed to be Osiris in his first avatar. Isis, again, was supposed to be incarnate in the sacred cow. Numerous temples were built in honour of Osiris, Isis, and Serapis respectively; while others were dedicated to their brother, the dog-headed Anubis, whose image was borne aloft in religious processions. Eventually Egyptian mythology was elaborated to an excessive degree, developing into a form of nature worship, and cattle, dogs, cats, crocodiles, insects, plants, and constellations all became associated with certain spiritual attributes. Cooper's Myth of Ra (1877); Maspero's L'Archéologie Egyptienne (1887); Le Page Renouf's Religion of Ancient Egypt (1897); Wallis Budge's Egyptian Religion (1900), and his translation of The Book of the Dead; Lang's Myth, Ritual, and Religion (ed. 1901); Steindorff's Religion of the Ancient Egyptians (1904); and Garnier's Worship of the Dead (1904).

GRÆCO-ROMAN MYTHOLOGY, as indicated above, is traceable to the same source as that of Egypt, although it has thrown out local developments. Zeus, or Jupiter, a supreme solar deity, is the analogue of Osiris; and Juno is merely Isis under another name. This connection between Greece and the Orient is discussed by Gruppe in his Griechische Culten und Mythen (1888). The leading personages of the Græco-Roman pantheon and their various characteristics are familiar to most, and further detail is here un-Decharme's necessary. See Mythologie de la Grèce Antique; Preller's Griechische Muthologie (1888), and also his Römische Mythologie; and Miss Jane E. Harrison's Prolegomena to the Study of Greek Religion (1903).

NORTHERN MYTHOLOGY is the system of religious beliefs held by the Teutonic race before their adoption of Christianity. These are largely nature myths. The death of the summer is held to denote the guilt of Höder (winter). who, instigated by the evil god Loki, slays Balder, the summer god. Odin has two ravens, Hugin (thought) and Munin (memory), to sit on his shoulders and whisper wisdom into his ears. Thor is specifically the strong god. giant Norve had a daughter Nott (night) of swarthy complexion, who bore Jord (earth) and Dagr (day). Allfather, giving Night and Day two horses and two cars, hoisted them up into the sky to drive over the earth alternately. Night rides first with her steed Hrimfaxe (rime - mane), which every morning at the end of his ride bedews the earth with foam from his bit. Day's steed is Skinfaxe (shining mane), which on his career spills light all over sky and earth. In the beginning, ere yet the earth was, there lay far in the north Nisheim

(abode of darkness), and far in the south Muspelheim (abode of fire); between them, Ginungagap (yawning gap), the wide abyss. The venomous vapours rising from Ginungagap, freezing to rime, formed so many congealed layers. These getting thawed by fiery blasts from Muspelheim, there trickled down large drops which, quickened into life by the might of Surt, the giant warder, formed a huge giant Ymir. A vast cow, Audhumbla (chaos), was also born of wedded Frost and Fire, and her milk fed the giant Ymir. Licking the salt rime on the stones, the cow gave birth to Bure, whose three grand-sons were Odin (spirit), Vili (will), and Ve (holiness). These (will), and Ve (holiness). These three slew the giant Ymir, and, dragging his dead body into Ginungagap, carved the world out of it. His flesh was the dry land, his blood the ocean, his bones the rocks, his hair the forests, his skull the sky, his brain, flung into the air, the clouds. Shreds of fire and sparks from Mugnelheim set in sparks from Muspelheim, set in the sky skull, blazed as sun and moon or sparkled as stars. Out of two trees found by the seaside Odin, Hœnir, and Lodur made the first man and woman-riz. Ask and Embla-Odin giving them breath, Hœnir giving them feeling, and Lodur shape and blood. Norse geography counts nine worlds. The lowest is Niflheim, the highest Muspelheim; between them Midgard (Midyard) or Mannaheim, the abode of man. High above the mid-world is Asaheim, home of the Asas, or gods; at its centre Idavöll, the meeting-place of the gods, and Odin's throne whence he over-looks all the nine worlds. Beyond the ocean, which engirdles the earth, is Jötunheim, abode of the giants. Close above the earth is Ljosalfheim (abode of light elves), and between it and Asaheim is Vanaheim (abode of the Vans, or sea-gods). Down-wards from the earth is Svartalfaheim (swart elf home); lower still, Helheim (abode of the dead). The Norse pantheon numhers twelve gods—or, including Njord and Frey, the adopted Van gods, fourteen—and twentysix goddesses. The head god Odin, or Wodan (whence Wednesday), is the inventor of runes, the founder of poetry and culture, the god of battle; Thor (whence Thursday), son of Odin, is the Thunderer, wielding the hammer Mjolnir. The friend of man, Thor is incessantly harrying the intractable frost giants. Tyr intractable frost giants. Tyr (Aryan Dyaus, Gr. Zeus; whence Tuesday) was originally the heaven god, worshipped as such by the Swabians, Rheinlanders, Goths; he had a sanctuary at

Augsburg, whose citadel long bore the name of Tiwesburc. The most beloved of all the gods is Balder, the beautiful, the sun-god. Existence is figured as the world-tree Yggdrasil. It shoots its roots, one down to the undermost plain of Niflheim, a realm of Hela, where it is watered at the well of Hvergelmir; another into Jötunheim, where it drinks at Mimir's fountain of wisdom; a third root into the kingdom of the Asas, or gods, whence it draws refreshment from the holy Urdar fount, at which sit three maidens, Urd, Verdandi, and Skuld (Past, Present, and Future), watering its root. These Norns -Past, Present, and Future spin for each man his thread of destiny. Prominent in Norse mythology are the Valkyrs, or choosers of the slain, who bear the brave (the Einherjer, or champions) who have fallen in battle aloft to Olin's Valhalla. The The dastards are doomed to Hel's dark and doleful dungeon. All things portend the final catastrophe - Ragnarök, or the twilight of the gods. The gods know they too must die. The chained monster, the Fenrir wolf, breaks loose. The serpent that enfolds the earth writhes, tilts up heavy volumes of sea over the earth, and vomits poisonous floods into the air.
The wolf swallows Odin, but is killed by Vidar. Thor slays the serpent, but dies himself from the serpent's venom. Out of the dissibilities in Paragraphs solution of all things in Ragnarök there emerge a new heaven and a new earth. See the two Eddas, R. B. Anderson's Norse Mythology (5th ed. 1891), Laing's Heimskrin-yla (new ed. by R. B. Anderson, 1889), V. Rydberg's Teutonic Mythology (trans. by R. B. Anderson, 1889), Finn Magnusson's Lexicon Poeticum (1787), N. M. Petersen's Nordisk Mythologie (1849), P. A. Munch's Norrane Guder-og Helte-Sagn (1854), R. Keyser's Religion of the Northmen (trans. by Barclay Pennock, 1854, Keary's Mythology of the Eddas (1882), Olrik's Om Rugnarök (1902), and H. Schück's Studier i Norsk Litteratur og Religionshistorie (1904). See also Macdonald's Religion and Myth (1893), Aston's Nihongi (1896), Frazer's Golden Bough (ed. 1900), and D'Arbois de Jubainville's Le Cycle Mythologique Irlandais et la Mythologie Celtique (Best's Eng. trans. 1903).

Mytilini. (1.) Or MITYLENE, also LESBOS, isl. of the Ægean Sea, belonging to Turkey in Asia. It is indented in the s. by two deep, landlocked harbours. In the interior it rises to 3,075 ft. The chief productions are olive oil, soap, excellent wine, grapes, figs, and timber. Area, 675 sq. m.

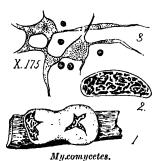
Pop. (1896) 125,000. It was colonized by Æolian Greeks at an early date, and became the home of the Æolian school of lyric poetry. It was the birthplace of Sappho, Alcaus, Terpander, Arion, Pittacus, Hellanicus, Theophrastus, and Phamas. (2.) Or Kastro, chief city in above isl., on E. coast. During the 5th century it was allied to Athens, but revolted in 428 B.C. After the Peloponnesian war it remained independent, though it joined the second Athenian league (377 to 357 B.C.). Finally it was included in the Roman empire. It was the birthplace of the pirate brothers Aruk and Khair ed-Din Barbarossa. Towards the close of 1905 the town was occupied by the European powers, in order to compel the Sultan to accept a new scheme of Macedonian administration intended to take the place of the terminated Murzsteg agreement. Pop. about 20,000. See Koldewey's Lesbos (1890).

Myxœdema, a disease in which a prominent symptom is the deposition of mucin subcutaneously. It is connected with atrophy or loss of function of the thyroid gland, and is a disease of the adult, the same condition of the thyroid in infants resulting in cretinism. It is more frequent in females-some records show a proportion of six to one-and it is held by some to be at times hereditary. It is a markedly progressive disease, which, until within the last few years, practi-cally always ended in death after a gradual clogging of all faculties. The first symptom is an increasing weakness and disinclination for all exertion, mental or bodily. The brain is clear, but very slow in acting. There is a more or less constant unpleasant taste or smell. A most noticeable thing is an increasing puffiness about the face. The thickening or puffiness does not pit on pressure, as it does in Bright's disease. The skin feels coarse, thick, dry, and harsh to the touch. The face is pale, except for patches of colour on the checks. The temperature soon becomes sub-normal, dropping even four or five degrees. hair goes, the teeth drop out; there is often a tendency to bleeding on slight provocation; the sufferer is perpetually chilly. Either the thyroid gland cannot be felt in the front of the neck. or it is felt as dense fibrous tissue, instead of as a soft gland. With these bodily symptoms come an increasing melancholy and men-tal weakness. Death is due to heart failure or inanition.

Treatment.—Doses of thyroid gland, usually the sheep's, are

given, in the form either of the whole gland or an extract. Under this treatment, unless the patient is already so exhausted as to have no power of recovery, myxædema is among the most certainly curable of diseases. To supply the deficiency of the functionless gland, however, the treatment can never be entirely stopped, though the dosage is much lessened on recovery. During the early stages of treatment the patient is kept in bed. If the whole fresh gland is used, it is essential to ensure that the true thyroid is procured.

Myxomycetes, a division of the group of cryptogamic plants known as thallophytes. They represent the very lowest grades of vegetable life. They are chiefly saprophytes, living on dead organic matter, though some are parasites—e.g. Plasmodiophora brassicae, which causes club-root in cabbage. The yellow masses,



 Æthalium septicum; 2, section; 3, part of capillitum and spores × 175.

known as flower-of-tan, which often appears on tan in the summer months, are fructifications of a member of this division, Athalium septicum. The manner of development and increase among the myxomycetes is usually somewhat as follows. The protoplasmic contents escape through the wall of a spore, and move usually in amorboid fashion, but sometimes by means of cilia, and grow. At a certain stage a number of amœboid bodies come together and coalesce into one large plasmodium. In the centre of the plasmodium a number of cells arise, become covered with cellulose, and unite to form a column perpendicular to the substratum. As this column grows in height the surrounding protoplasm of the plasmodium creeps up its sides, and ultimately accumulates at its summit, forming the fructification, and then breaks up into a number of spores.

Mzensk. See MTSENSK.

N is the point nasal; the mouth passage is closed by the point of the tongue, and the breath passes through the nostrils. It corresponds to the point stop t, and there are as many different n's as there are t's. (See T.) Before b and even f, n naturally changes into m, and words spelled with n in this position are often pronounced with m (in Arabic, Welsh, etc.); so in 'Banff' and in the local pronunciations of 'Denbigh' and 'Dunbar' (cf. 'Dumbarton'). A very common phonetic change of n is into ng, the back nasal. sound corresponds to the back sound corresponds to the back stops k and g, and the change frequently takes place before these letters, as in 'bank,' 'fin-ger' (cf. also 'uncle,' 'anxious'). When the g following the n becomes silent, as it very often does, ng comes to symbolize the back nasal sound (as in 'long'). It may be employed phonetically with this value, in the same way that th is employed to express a simple sound.

The early Semitic form of N was the present form inverted, and having a long right hand stroke. retains the long stroke, and with it the cross stroke, but in a horizontal position; is a further modification of that form. ν is obviously abbreviated from N. The Semitic name nun, Greek nu, means 'fish.

Naas, mrkt. tn., Co. Kildare, Ireland, 18 m. s.w. of Dublin; was once the residence of the kings of Leinster. Pop. (1901) 3,836.

Nääs, vil., 20 m. N.E. of Gothenburg, Sweden, noted for a famous educational establishment, conducted by Herr Salomon, and annually visited by teachers from all parts of the world for courses in wood sloyd (woodwork), Swedish drill, school games, etc. Lectures are delivered in English, Swedish, and German.

Naba, seapt., Okinawa I., Lu-chu group, Japan; trades in silk, cotton, and sugar. Pop. (1898) 35,453.

Nabatæans, a tribe of Ara mæan speech, originally settled on the borders of Elam and Babylonia, and which invaded Edom in the 4th century B.C. Assyrian inscriptions they are called Nabatu, and are to be distinguished from the Nabayati or Nebajoth, an Ishmaelite tribe mentioned in Gen. 25:13. They were a warlike people, and seem to have made considerable progress in art and letters. We hear of them in the wars of Antigonus (c. 312 B.C.), with Sela (later Petra) as their centre. The best known of their kings was Aretas IV. (9

B.C.-40 A.D.), under whom the kingdom extended from the Euphrates to the Red Sea, and included Damascus (2 Cor. 11:32). It was eventually amalgamated with the Roman empire under Trajan in 105 A.D. It is probable that the term 'Arabia' is some-times used in Scripture for the land of the Nabatæans—as, for example, Gal. 1:17, where it means Arabia Petræa.

Nabbes, THOMAS (fl. 1638), English dramatist, was born in Worcestershire, and spent the greater part of his life in London. His tragedy, Hannibal and Scipio, was acted in 1635. His comedies, including Covent Garden (1638), and his masques, achieved some popularity. His collected Works (ed. Bullen) appeared in 1887.

Nabha, feudatory state, Punjab, India. Area, 936 sq. m Pop. (1901) 297,949. Cap. Nabha m. 14 m. n.w. of Patiala. Pop. (1901)

18,468.
Nabis, a native of Sparta in ancient Greece, who made himself tyrant in 207 B.C. He attacked Megalopolis and seized Messene in 202 B.C.; in the next year, however, Philopemen, commanding the forces of the Achaean League, defeated him with great slaughter. In 192 B.C. he was assassinated by Alexamenus, a leader of mercenaries.

Nablus (anc. Shechem), tn., Palestine, 28 m. N. of Jerusalem, between Mts. Ebal and Gerizim, residence of a Greek bishop. Sиеснем.) Рор. about 17,000.

Nabob, a title applied to the administrator of a province under the Mogul empire in India. After the fall of that empire it was applied to natives who occupied positions of wealth and importance, but had no official standing. It was the nabob Suraj ud Daula who was responsible for the 'black hole' of Calcutta, and whom Clive routed at Plassey (1757).

Nabua, tn., prov. Ambos Camarines, Luzon, Philippines, 20 m. s.e. of Nueva Caceres. Pop. 17,789.

Nachod, tn., Bohemia, Austria, 15 m. s.E. of Trautenau; has cotton mills and bleachfields. In June 1866 the Prussians secured several victories near the town. Pop. (1900) 9,899.

Nachtigal, Gustav (1834-85), German explorer, born at Eich-stedt, near Stendal. Charged in 1869 with a mission from the king of Prussia to the sultan of Bornu, he extended his journey to Lake Chad, and explored the Shari. Travelling through regions hitherto unvisited by Europeans, he reached Khartum in 1874. His account of this journey appeared as Sahara und Sudan (1879-89). He was German consul-general at Tunis until 1884. See Berlin's Erinnerungen an Nachtigal Erinnerungen an Nachtigal (1887), and Ruhle's G. Nachtigal

Nadaillac, Jean François Albert du Pouget, Marquis de (1818), French archæologist, born at Paris; served as prefect of Basses-Pyrénées (1871-6), and of Indre-et-Loire (1876-7). Among his works are L'Ancienneté de l'Homme (1868), Le Premier Homme et les Temps Préhistoriques (1880), De la Période (Haciaire (1884), Mœurs et Monuments des Peuples Préhistoriques (1888), and Unité d'Espèce Humaine (1899).

Naden. CONSTANCE CAROLINE WOODHILL (1858 - 89), English poetess and author, born at Edgbaston, Birmingham; was early attracted to the study of science and philosophy. Her philosophical theories are indicated in a volume of essays, Induction and Deduction, ed. by Dr. Lewins (1890). Her Songs and Sonnets of Springtime (1881), and A. Modern Apostle, and other Poems (1887), contain some good pieces. See Memoir by W. R. Hughes and others (1890).

Nadir, the point of the sky opposite to the zenith and vertically beneath the spectator. is determined as a zero point for measuring declinations, by directing a telescope straight down towards a basin of mercury, and observing the coincidence of the reticle at the focus with its reflected image

Nadir Shah or Persia (1688-1747), the Conqueror, born in Khorassan; helped Shah Tahmasp II. to drive out the Afghans (1725-7); deposed Tahmasp (1731); became regent for the infant Abbas III.; and on his death (1735) was proclaimed Shah (1736). Beaten himself by the Turks (1733), he ultimately (1734-5) regained from them Georgia, menia, Kars, and Erivan, and se-cured from Russia Derbend and Baku. Having taken Kandahar, he invaded India, captured Delhi (1738-9), and carried off the Kohi-nur diamond and the Peacock throne; and subdued Bokhara and Khiva (1741). Fiercely tyrannical after 1742, he was assassinated by

after 1742, he was assassinated by the captain of his guards. See Nadir Shah, by Maynard (1885). Nadiya, or NaBADWIP, anc. cap. of Nadiya dist., Bengal, India, 55 m. N. of Calcutta. Near it is the battlefield of Plassey. Pop. (1900) 10.880. The district has an area of 2,982 sq. m., and a population (1901) of 1,667,491. Indigo is the principal product. Indigo is the principal product. Krishnagar is the chief town.

Nadol, tn., Jodhpur state, Rajputana, India, 68 m. n.w. of Udaipur; noted for its architectural

remains.

Nægelia, a genus of tropical American herbaceous plants belonging to the order Gesneraceæ. As their heart-shaped leaves are often beautifully shaded, and their racemes of flowers usually brilliantly coloured, nægelias are often cultivated as stove plants. A light peaty soil is desirable; and when the leaves wither, the pots containing the roots should be kept quite dry till the growing season again comes round. They are usually propagated by means of stolons.

Naestved, mrkt. tn. on E. coast of Zealand, Denmark, 58 m. by rail s.w. of Copenhagen. Pop. (1901) 7,162.

Nævius, Gnæus, poet of ancient Rome, was probably a native of Campania, and served in the first Punic war (264-241 B.C.). For a libel on the Matelli he was imprisoned, and for another offence banished to Utica. He wrote, in the old saturnian metre, an epic on the first Punic war, from which Virgil borrowed freely. Nævius also wrote tragedies and comedies; his first was performed in 235 B.C. Only a few fragments of his works survive, for which see Bachrens's Fragmenta Poetarum Latinorum (1886). Nævus. See Angioma.

Näfels, vil., Swiss canton of Glarus, 41 m. by rail N. of town of Glarus, at entrance of gorge of Linth. On April 9, 1388, it was the scene of a victory of the men of Glarus over the Austrians. Pop. (1900) 2,557.

Naga Hills. See NOGA HILLS. Nagano, or ZENKOJI, tn., Hondo, Japan, 94 m. s.s.w. of Niigata. Its Buddhist temple, founded 670 A.D., is one of the most famous

in Japan. Pop. (1898) 31,319. Nagas, in Indian fable. One of the Rishis (holy men), named Kas-yapa, married two sisters. The elder, Kadru, became the mother of a thousand Nagas (= snakes); her sister, Vinata, bore Garuda, the enemy of the Naga race. The sons of Kadru took semi-human form, and it has been suggested that the serpent which tempted Eve was of this race. When the Nagas were absorbed into Hinduism, the serpent was deprived of its sting; its attributes of strength and immortality became centred in the regenerative powers of the god Siva, and the Naga was made the emblem of eternity.

Nagasaki, seapt. tn. s.w. of Kiushiu, Japan, 600 m. by the Inland Sea route from Yokohama. It lies at the head of a fine natural harbour, and its genial climate makes it an ideal health resort. The native town lies to the E. of the harbour; on the slopes be-

hind are the residences of the merchants. Engine works and shipbuilding yards occupy the opposite side of the harbour. Nagasaki owes its importance as a coaling station to its proximity to the rich coal mines of Takashima, 7 m. s.e. The exports for 1905 were valued at £439,565, and consisted chiefly of tea, raw silk and cotton, Portland cement, paper goods, rice, textiles, porce-lain, and lacquer ware; imports valued at £1,995,859. The manufactured goods include enamelled pottery and lacquer, and tortoise-shell ware. Nagasaki is noted for its temples and its festivals, the chief among the former being the Shinto 'Bronze Horse Temple. It has also a college modelled on European lines. In 1859 it became one of five treaty ports. Pop. (1905) 163,324.

Nägeli, JOHANN GEORG (1768-1836), Swiss musical composer and music publisher, was born at Zürich. He published some fine editions of classical music, and several of Beethoven's sonatas, into one of which (Op. 31) he interpolated four bars in the first movement. See Life, in German,

by Schnabeli (1873)

Nägeli, KARL WILHELM (1817-91), German botanist, was born near Zürich. He was appointed professor at Zürich (1855) and at Munich (1858). His chief work is Beiträge zur Botanik (1858-68). He is credited with the discovery of the antheridia and spermatozoids of ferns, and he gave the first account of growth by means of a single apical cell. See Life, in German, by Cramer (1896).

Nagina, munic. tn., Bijnaur dist., United Provinces, India, 52 m. E.N.E. of Meerut; has manufactures of cloth, glass ware, cotton, and ebony-carving. Pop. (1901) 21,412.

Nagode, tn. in native state of same name, Central India, 17 m. w. of Sutna. The state is 450 sq. m. in area; cap. Unchehra.

Nagoya, fort. tn., Hondo, Japan, 94 m. by rail E.N.E of Kioto; is the emporium for the pottery of Seto. It is also noted for cloisonne enamels. Cotton and silk fabrics are manufactured. The castle, built in 1610, is one of the wonders of Japan. Pop. (1898) 244,145.

Nagpur, or NAGPORE, cap. of Central Provinces, India, in Nagpur div. and dist., 440 m. by rail N.E. of Bombay. It was an important town in the days of the Maratha empire. Its chief industry is cotton-weaving. Pop. (1901) 127,734. The district is 3,843 sq. m. in area. Irrigation is resorted to. Coal, antimony, and gold occur. The hill counand gold occur. The hill country is inhabited by the Gonds. Kamptee is the chief trading centre. Pop. (1901) 751.844.

Nagy-Banya, tn., Szatmar co., Hungary, 60 m. N.W. of Klasen-burg. It has a mint, gold, silver, and copper mines, and viticulture and potteries. It was founded in the 11th century by Saxon miners. Pop. (1900) 11,169.

Nagy-Becskerek. See BECs-

KEREK, NAGY.

Nagy - Karoly, tn., Szatmar co., Hungary, 41 m. N.E. of De-breczen; contains a castle of the Counts Karolyi. It has sawmills and cotton and linen manufac-

tures. Pop. (1900) 15,179.

Nagy-kikinda, tn., Torontal
co., Hungary, 37 m. w. of Temesvar. Pop. (1900) 24,419.

Nagy-Kara

Nagy - Körös, mrkt. tn., co. Pest, Hungary, 56 m. by rail s.w. of Budapest, in a wine-growing district; is noted for melons. district; is noted Pop. (1900) 26,512.

Nagy - Szeben. See HER-MANNSTADT.

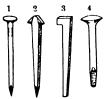
Nagy-Szombat. See TYRNAU. Nagy - Varad. WARDEIN. See GROSS-

Nahuati, a race in Spanish America, whose chief branch at the time of the discovery was the Aztecs of Mexico. The early migrations of the Nahuas were almost certainly from the north, and certain linguistic coincidences would seem to point to a remote connection with the Shoshone

(Snake) family.

Nahum, the seventh among the minor prophets of Israel. double title states the main subject of the book—an 'oracle con-cerning Nineveh;' and practically our whole knowledge of its au-thor--the 'book of the vision of Nahum the Elkoshite.' The most likely identification of Elkosh is with a place between Jerusalem and Gaza. Nahum is, then, a fellow-countryman of Micah. The book contains a vivid description of the siege of Nineveh and its ruin. Accompanying this is an outburst of indignation against the moral gangrene in the city. The intensity of the prophet's vision makes it likely that the oracle was written not long before Nineveh's fall (606 B.C.). Ch. 1, 2:2 is a psalm on the double character of Jehovah's jealousy — His jealousy against His enemies, His jealous care for those who trust in Him. Efforts have recently been made to prove the psalm an alphabetic acrostic, but these are not wholly successful. Nor is the nature of the references to the people's condition clear enough to justify the denial of this psalm to the same prophet who foretold Nineveh's ruin. See Davidson's Cambridge Bible (1896): Nowack's Kleine Propheten (1897). For the critical study, Bickell's Beiträge zur Semitischen Metrik (1894), and G. B. Gray in the Expositor (Sept. 1898). Naiad, a British second-class cruiser (3,400 tons), launched in 1890. The first ship of the name in the navy was the French Naïade, captured April 14, 1783.

Naindes. See NYMPHÆ. Nainati, munio. tn., dist. of 24 Parganas, Bengal, India, 22 m. N. of Calcutta. Pop. (1901)23,753.



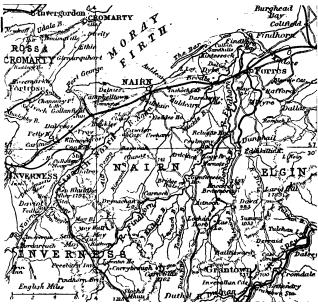
Forms of Nails. Nails are mostly made of wrought iron, but steel, zinc, copper, brass, cast iron, and alloys are all used. Until near the close of the 18th century all nails were hand made. To America were hand made. To America belongs the distinction of having first made cut nails by machinery. Nails generally have two sides parallel, which should be driven in line with the grain of the wood to avoid splitting. Hard woods are bored for the reception of the nail; with soft woods this is not necessary. nails (1) are circular or elliptic, sometimes rectangular, in cross section. They are sometimes called French nails; they do not readily break, but are apt to split the wood. Cut clasps (2) are machine cut from wrought-iron plates. Nails of the shape of (3), with heads projecting only on one side, are known as brads, and are used where the nail hole is to be as small as possible. Clout nails (4) have large, flat, circular heads. Copper and composition nails of this type are used for securing slating. Needle points are small, hard steel pins used in fixing mouldings and veneering in mouldings joinery. Punches (short steel bars) are used in giving the final blows to nails, so as to drive in the heads without injuring the surface of the wood. Treenails are hard wooden pins employed where metal would be apt to rust. See also SCREW NAILS.

Nails, in biology, are structurally modifications of the skin, and tend to be affected by similar diseases. They develop from a bed or matrix, which is for the most part highly vascular; hence the pink appearance given to healthy nails. The white halfmoon at the base is caused by greater opacity of the nail, and by less vascularity. Well-developed nails at birth are a proof that the child is not prematurely born. Ingrowing toe nail is the commonest nail trouble. The irrita-

tion of the flesh by pressure on the sharp lateral edges of the nail sets up inflammation. Treatment is to relieve pressure by paring the nail, to avoid tight boots, and to pack threads of lint between the nail and the flesh.

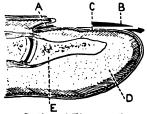
Naini Tai, munic. tn., Kumaun dist., United Provinces, India, 70 m. N. of Bareilly, is the summer resort of the lieutenant-governor of United Provinces. It has a beautiful lake (6,409 ft. above sea level). Pop. (1901) 7,609. The district has an area of 2,658 sq. m.; pop. (1901) 311,237.

Nairne, LADY CAROLINE (1766-1845), Scottish poetess, was born at Gask, Perthshire. Her early lyrics were mostly contributed to R. A. Smith's Scottish Minstrel (1821-4). She excels in pathos, as in The Rowan Tree, The Land o' the Leal, and The Auld Hoose; and in humour, as in The Hundred Pipers and The Laird of Cockpen. Her pathetic gift also found scope in her Jacobite ballads. See Lays from Struthearn, by Caroline Baroness Nairne (1846), and Roger's Life and Songs of the Baroness Nairne (1869).



Nairnshire.

Nairn, royal and parl. bor., seapt., and co. tn. of Nairnshire, Scotland, on Moray Firth, 15 m. by rail N.E. of Inverness. Its golf links and its beach have



Section of Finger-nail.

A, Root and B body of nail; c, nail bed; D, pulp of finger; E, terminal phalanx of finger.

brought it much into favour as a summer resort. Haddock and salmon fishing is carried on. Grant, the African traveller, was a native. Pop. (1901) 4,487.

Nairnshire, maritime co., N.E. Scotland, bounded on N. by Moray Firth, on S. and W. by Invernesshire. Area, 162 sq. m. The mountains in the S. range between 1,500 and 2,000 ft. (Cairn Glas, 2,162 ft.). Nairn unites with Elginshire to return one member to Parliament. Cawdor Castle and Kilravock Castle are places of interest. Pop. (1901) 9,291.

Nairobi, cap. of prov. Ukamba, British E. Africa. It is a centre of the Uganda railway. Pop. (1901) 8,000.

Najibabad, munic. tn., Bijnaur dist., United Provinces, India, 55 m. N.E. of Meerut. It manufactures brass, copper, and iron ware. Pop. (1901) 19,568. Nakhichevan, tn., Russian

Nakhichevan, tn., Russian Transcaucasia, Erivan gov., 95 m. s.e. of Erivan. Tradition affirms that it is the place where Noah settled after the flood. Pop. (1897) 8,845. and advanced as far north as 86° 13'6'. The explorers wintered in Franz Josef Land, and were carried to Norway by the Jack-son-Harmsworth expedition. The narrative of the expedition appeared as Farthest North (1897), and of the volumes of the scientific results Nansen contributed to vol. vi. (1905). Nansen took a prominent part in the movement for the separation of Norway from Sweden, and in November 1905 was appointed Norwegian minister

to N.E. by N., seldom exceeding 6,000 ft. in height, and extending from Tong-king through the east-ern provinces of China s. of the Yang-tse-kiang.

Nanterre (anc. Nemptodurum), tn., dep. Seine, France, 7 m. by rail W.N.W. of Paris; has manufactures of aluminium. Near are a large prison and a mendicity a rage pison and a memority asylum. The town originated in A.D. 420, as the shrine of Ste. Geneviève, the patron saint of Paris. Pop. (1901) 14,140.



Fridtjof Nansen. (Photo by Lankester, Tunbridge Wells.)

at London. See Fridtjof Nansen, by W. C. Brögger and N. Rolfsen (1896), and Nansens Erfolge, by Enzberg (ed. 1899). Nan-shan. (I.) Mountains in prov. Kan-su, China, the E. por-tion of the Tian-Shan system, stretch over ten degrees of longi-tude. They consist of five or six tude. They consist of five or six snow-covered parallel chains, running S.E. to N.W., with passes from 13,000 to 14,500 ft. above the sea. (2.) Belt of mountains about 1,000 m. long by 400 m. wide, with a general trend from s.w. by w.

Nantes, EDICT OF. See EDICT and FRANCE.

Nantes, tn., France, dep. Loire-Inférieure, on r. bk. of Loire, 35 m. from the sea. Most of its sea-borne trade has been diverted to St. Nazaire, near the river mouth. A ship canal (27 m.) is endeavour-A ship canal (21 III.) is since the ing to overcome this drawback. Chief exports: hardware, preserved provisions, and wine. The exports are under £1,000,000 in yearly value. Nantes builds ships; has some cotton mills and iron foundries; prepares

sardines, preserved meats and fruits; and manufactures soap, sugar, and leather. In its castle (14th century) Henri IV. signed the Edict of Nantes (1598). The cathedral (1434-1852) contains an exqusite Renaissance monument by Colomb to the last Duke and Duchess of Brittany. The town was the ancient residence of the dukes of Brittany. At Nantes John Knox served as a galley slave (1547-9), and from it Prince Charles Edward set sail in 1745. Here, too, the infamous Carrier organized the wholesale murders known as the noyades. Nantes was the birthplace of Anne of Brittany (1514), Lamoricière (1906), and Jules Verne (1828). Pop. (1901) 132,990.

Nanticoke, bor., Luzerne co., Pennsylvania, U.S.A., in the anthracite coal region, 100 m. N.w. of Philadelphia. Pop. (1900) 12,116.

Nantucket, isl. off s.E. coast of Massachusetts, U.S.A. The town of Nantucket and several villages are frequented in summer on account of the mild,

mer on account of the mina, stimulating c.imate. Area of isl., 51 sq. m. Pop. (1900) 3,006. Nantwich, tn., Cheshire, Eng-land, 4 m. s.w. of Crewe. The grammar school dates from 1611, and several Elizabethan houses remain. Brine baths were opened in 1883. Nantwich is the centre of the Cheshire cheese trade, manufactures boots and shoes, and has tanneries. The last salt works were closed in 1856. Pop. (1901) 7,722.

Naoroji, DADABHAI (1825), the first Parsee to sit in the British House of Commons, was born in Bombay, and appointed head native teacher at the Elphinstone Institute College in 1845, and professor of mathematics and natural philosophy in 1855.

Twelve years later he helped to establish the East India Association. He was prime minister to tion. He was prime minister to the dewan of Baroda in 1874. He was returned for the Central Finsbury division (London) at the general election of 1892. One of the 'blazing indiscretions' of the Marquis of Salisbury was to sneer at Mr. Naoroji as 'a black man.'

Naphtha, a term applied to the mixture of low-boiling hydrocarbons obtained in the distillation of petroleum, coal tar, and shale oil. Petroleum naphtha consists chiefly ٥f paraffins and naphthenes; coaltar naphtha is mainly benzene (C6H6), toluene (C6H5CH3), and higher homologues; whilst the naphtha of shale oil contains olefines as well as paraffins. All these naphthas are volatile, very inflammable liquids with benzenelike odour, and are valuable as solvents for fats, resins, and gums,

and as fuel in vapour lamps and motors. Wood naphtha is the crude spirit obtained by distilling wood, consists largely of methyl alcohol and acetone, and is used as a solvent and for 'denaturing'

alcohol.

Naphthalene, C₁₀H₈, an aromatic hydrocarbon, constituted by the junction of two benzene rings, and obtained from the fraction of coal tar boiling from 170-230° C., from which it crystallizes on standing. It is filtered off from the accompanying creosote oils, pressed, purified with acid and alkali, and distilled. Naphthalene forms colourless, leafy crystals, with a peculiar odour. It has a sp. gr. of 1'15, melts at 80° C., boils at 218° C., and burns with with a very luminous smoky flame. Naphthalene yields two classes of derivatives, called a and β according to the position of the entering groups, and of these the nitro- and amido-naphthalenes are employed as starting-points for synthetical dyes, whilst the phthalic acid obtained by oxidation is the first stage in the modern process for the preparation of artificial indigo. Naphthalene itself is used as an insecticide and deodorant, whilst under the name of 'albo-carbon' it is used to enrich coal gas.

Naphthol, C10H7OH, exists in two varieties, α and β , which are the mono-hydroxy derivatives of naphthalene. Both are volatile, crystalline solids, somewhat resembling phenol. The a variety (sp. gr. 1'224, m.p. 94° c., b.p. 279° c.) is with difficulty, and the β (sp. gr. 1.217, m.p. 122° c., b.p. 285° c.) easily, soluble in waterthe a giving a violet colour, and the β a green colour, to ferric chloride. \$\beta\$ naphthol is an antiseptic, and both varieties are important sources of dye-stuffs.

Naphthylamine, or AMIDO-NAPHTHALENE, C₁₀H₇NH₂, occurs in α and β modifications: α naphthylamine is a crystalline solid (m.p. 50° c., b.p. 300° c.) that is insoluble in water and has a disgusting odour; the β variety (m.p. 111°c., b., 294°c.) is odour-less and soluble. Both varieties and their derivatives are used in the preparation of dye-stuffs.

Napier, chief tn. and port on E. coast of North Island, New Zealand, on Scinde I. (really a peninsula). It exports wool and meat, and is a winter resort. Pop. (1901) 8,775.

Napler, Sir Charles (1786-1860), British admiral, was born in Striingshire. In 1809 he was present at the capture of Martinique, and took part in the capture of the Hautpoult. In 1811-13, he was the hero of several daring exploits in the Mediterranean, and in particular, of the capture of Ponza. In 1833 he entered the service of Dom Pedro of Portugal, for whom he won a victory over the fleet of Dom Miguel off Cape St. Vincent. In 1840 he took a prominent part in the capture of St. Jean d'Acre. In 1854 he was commander-inchief in the Baltic against Russia. His writings include Remarks on the State of the Navy (1851), Account of the War in Portugal (1836), and The War in Syria (1842).

See Life by E. Napier (1862). Napier, Sir Charles James (1782-1853), English general, born in London. He served in the Irish rebellion of 1798; was present at Corunna and taken prisoner ; served in the expedition to the Chesapeake in 1813. His bril-liant victory at Meanee in 1843 crushed the power of the rulers of Sindh and led to the annexation of that province. He was commander-in-chief in India from 1849-51. Works: Lights and Shadows of Military Life! 1840), and Indian Misgovernment 1853). See Lives by W. Napier (1857), W. N. Bruce (1885), and Butler (1890).

Napier, FRANCIS, NUNTH BARON NAPIER, and FIRST BARON ETTRICK OF ETTRICK (1819-98), was appointed envoy-extraordinary to the United States (1857), to the Hague (1858), to Russia (1860), and to Prussia (1864). He was temporary vicercy of India from February to May 1872

Napler, JOHN (1550-1617), inventor of logarithms, was born at Merchiston Castle, near Edinburgh; discovered a method which superseded the long and laborious arithmetical operations which the solution of the most simple trigonometrical problems then exacted—viz. that of logarithms, or 'Napier's bones.' His tables were published in 1614 as Mirifici Logarithmorum Canonis Descriptio, followed by an explanatory work in 1619, Mirifici Logarithmorum Canonis Con-structio. He also wrote Plaine Discovery of the Whole Revelation of Saint John (1593), and Rabdologiæ seu Numerationis per Virgulas Libri duo (1615), in which he showed how to simplify and shorten the processes of multiplication and division. See Life, by the Earl of Buchan and W. Minto (1787). Napier, MAGVEY (1776-1847), editor of the Edinburgh Review,

was born at Kirkintilloch, Dumbartonshire; was librarian to the Signet Library (1805-37), and succeeded Jeffrey as editor of the Edinburgh Review (1829). He also edited the seventh edition of the Encyclopædia Britannica. See Selections from Correspond-

ence (1879).

Napier, Sir William Francis PATRICK (1785 - 1860), British soldier and historian, was born at Celbridge, Co. Kildare, Ireland, and served in the expedition against Copenhagen (1807), and in the Peninsula (1808). His History of the Peninsular War (6 vols. 1828-40) is a valuable authority. He also published a history of Sir Charles Napier's Administration of Scinde (1851), and Life and Opinions of General Sir C. J. Napier (1857). See Life

by Lord Aberdare (1864).

Napier of Magdala, ROBERT CORNELIS NAPIER, FIRST BARON (1810-90). British field-marshal; was engaged chiefly in irrigation works until the first and second Sikh wars. Throughout the mutiny, and especially at Lucknow, he took an important part. In 1860 he joined the expedition to China under Sir Hope Grant. After serving on the council of the governor-general of India, he temporarily took the governor's place on Lord Elgin's death. The rapid and complete success of his expedition to Abyssinia (1868), in which he stormed Magdala, won for him a peerage. From 1870 6 he held the chief command in India, and in 1883 was made field-marshal. Memoir by R. Maclagan.

Naples (Ital. Napoli). (1.)
Province, Italy, bordered on s. and w. by the sea. Area, 355 sq. m.; pop. (1991) 1,151,834. The s. half is mountainous (Mount Vesuvius); the rest is fertile plains. Oil, wine, corn, hemp, cotton, chestnuts, and seeds are produced. There are chemical and machinery factories, while boilers, motors, wire, nails, chocolate, wallpaper, bronzes, playing cards, buttons, musical instruments, lace and cotton goods

are also manufactured. (2.) Town, cap. of the above, and an archiepiscopal see, beautifully situated on the Gulf of Naples, 180 m. by rail s. E. of Rome. Since the cholera epidemic of 1884, the narrow, insanitary quarters of the old town have been pulled down, the site drained, and model dwellings erected at a cost of some £5,000,000. The cathedral, commenced in 1272, was completed in 1316. The university (5,550 students) was founded by the Emperor Frederick II. in 1224. Among other public buildings are the castle of St. Elmo (1343); the new castle, built by Charles I. in 1283; the Borbonico (now National) Museum, founded in 1586; the royal palace, dating from 1600; and the San Carlo theatre, opened in 1737. There is a biological marine station. The harbour has been recently enlarged and improved. In 1904 the imports were valued at £4,365,603, and the exports at £3,281,714. Shipbuilding is a thriving industry. Naples is a port

of embarkation for emigrants. Founded very early by Cumæans, under the name of Parthenope, the town was taken by the Romans (326 B.C.), and became a a favourite summer resort and watering-place, and the scene of the quinquennial games. Virgil was buried here (19 B.C.); the Emperor Nero made his first appearance as an actor at Naples (64 A.D.). It was taken by Theodoric the Great in 493, and again by Belisarius in 536. Seven years later Totila recaptured it, while in 553 it had to surrender to Narses. After having been incorporated with the Eastern em-

Naples Yellow is an anti-moniate of lead, prepared by fusing together common salt, tartar emetic, and lead nitrate. It is of yellow colour, and is used for china and glass staining as well as for an artist's pigment.

Napoleon, a French gold coin of twenty francs, but no longer issued; weighed 6'45161 grams, and was worth £'79286, or 15s.

101d. sterling.

See GAMBLING. Napoleon. See GAMBLING. Napoleon I. (1769-1821) emperor of the French, was born at Ajaccio in Corsica, as a French subject, though his ancestors had migrated from Italy. Napoleon was sent in 1779 to the military



Bay of Naples.

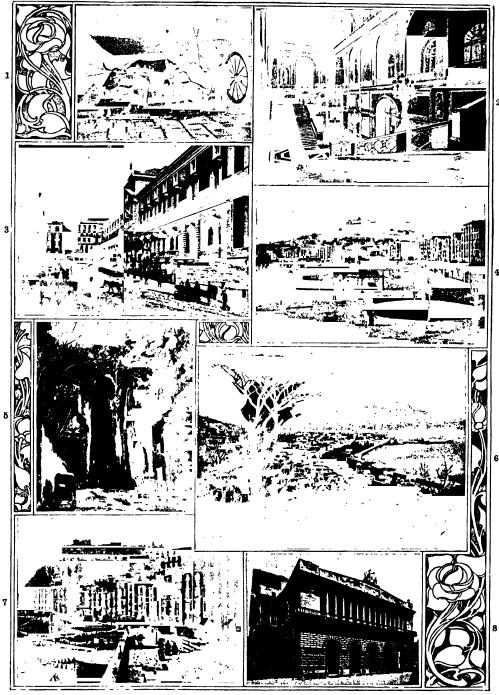
pire, it became a duchy in 572, and in 1139 it was made the capital of the kingdom of Naples. The French took it in 1501, and the Spaniards two years later. It was captured by the Austrians in 1707, submitted to Don Carlos in 1734, and became the capital of the French Parthenopean re-public in 1799. Joseph Bonaparte resided here from 1806 to 1808, when he was succeeded by Joachim Murat, while Ferdinand IV. re-entered the city as king in 1815. An insurrection, led Masaniello, took place in 1647. and another insurrection in 1848. The city was injured by an earthquake in 1694. Pop. (1901) 563,540.

school of Brienne in Champagne, and in 1784 to that of Paris. 1785 he was appointed junior lieutenant in the army. He was in Paris on June 20, 1792, and saw the mob invade the Tuileries. He also witnessed the overthrow of the monarchy on August 10. In 1793 he took a leading part in ousting the English from Toulon, and in 1794 was appointed general of the artillery of the army of Italy, and in driving back the Sardinians showed considerable skill. In the crisis of Vendémiaire (1795) he was entrusted by Barras with the task of suppressing the rising in Paris. He was married to Joséphine Beauharnais on March 9, 1796, and two days later left

to assume command of the army in Italy. He first overthrew the Austrians and Sardinians at Millesimo and Dego, and forced the Sardinians to make the armistice of Cherasco on April 28, 1796. He then turned against the Austrians, whom, after a severe struggle at the bridge of Lodi (May 10), he drove across the Adda. Then he drove across the Adda. Then ensued the celebrated fights for Mantua-Castiglione (August 5), Arcola (November 15), and Rivoli (Jan. 14, 1797). Mantua fell on Jan. 16, 1797, and the Emperor Francis II. agreed to preliminaries of peace at Leoben (April 18, 1797). Bonaparte had already organized Lombardy as a republic, and had forced the Pope to make the peace of Tolentino.

On his return to Paris Bonaparte obtained leave of the Directory to attempt the conquest of Egypt, which was meant to be the pre-lude of the restoration of the French supremacy in India. Sailing from Toulon on May 1798, he captured Malta, and landed in E_kypt (June 30). On July 2 he captured Alexandria. On July 21 the French won the hattle of the Pyramids, and the conquest of Egypt was effected. But Nelson's victory on August 1 in the battle of the Nile (Aboukir) was a most serious disaster to Napolcon. In February 1799 he invaded Syria, but failed to take Acre, which was defended by Sir Sidney Smith's squadron, He then massacred 2,500 prisoners at Jaffa, and returned to Egypt, where he defeated the Turks in the battle of Aboukir (July 25, 1799). Hearing of the successes of the second coalition in Europe, of the French loss of Italy, and of the state of France, he left Klé-ber in command in Egypt, and re-turned to his native land (October 9, 1799). The revolution of Brumaire (November 9) arranged by Sieyes followed, and the Consulate was established, with Bonaparte at the head of the govern-

Austria and England were now the chief focs of France. Early in 1800, Bonaparte crossed the Alps, occupied Milan, and on June 14 won the great battle of Marengo. On December 3, Moreau won the battle of Ho-henlinden, and on Feb. 9, 1801, the Emperor Francis II. agreed to the treaty of Lunéville. The terms were in the main the same as those of Campo-Formio. On March 27, 1802, the peace of Amiens was signed with Britain; on August I Bonaparte was proclaimed consul for life. The concordat with the Pope had The already (1801) been signed, and Napoleon, as he was henceforth called, gave to the nation the Bank of France and the Code



Views in Naples.

1. Carro da Trasporto. (Photo by Alinari.) 2. Palazzo Reale La Scala d'Onore, designed by Domenico Fontana. 3. Palazzo degli Scudi, or National Museum. 4. Villa del Popolo and Castel of St. Elmo. 5. Grotto of Pozzuell. 6. Panorama of the city from the Villa Patrizi. 7. Strada di Santa Lucia and Pizzo Falcone. S. Testro S. Carto. (Photo by Brogi.)

Napoléon, reformed its educational system, conciliated many of the old nobles, and instituted

the Legion of Honour.

During the years 1802 and 1803, however, Napoleon made prepara-tions for a fresh development in foreign policy. He proposed to found one colonial empire in the New World, and another in India. He determined to rearrange the map of Germany and to destroy Early in Britain's commerce. June 1802 he became president of the Italian republics, and in September and October he annexed Piedmont, Parma, and Piacenza. In February 1803 he reconstituted Switzerland, and sent secret agents to stir up rebellion in Ireland. Further, he persisted in demanding the British evacuation of Malta. On May 18, 1803, war between France and England broke out, and Hanover was occupied by French troops.

The discovery of a plot headed by Georges Cadoudal strengthened Napoleon's position, and on May 18, 1804, he became emperor of the French. Then he made elaborate preparations at Boulogne for conveying troops across the Channel and capturing London. In 1805 he incorporated the Ligurian republic with France, and forced Naples to make a treaty. But the defeat of Ville-neuve by Calder off Cape Finisterre in July destroyed all chance of a successful invasion of England, and in September he invaded Germany. The fall of Ulm (October 20) opened the way to Vienna; and though Nelson's vic-tory at Trafalgar, on October 21, destroyed the Spanish and French fleets, Napoleon defeated the Austrians and Russians on December 2 at Austerlitz, and on December 26 forced the Emperor Francis II. to make the treaty of Presburg. Austria being humbled and deprived of much territory, an opportunity was given Napoleon of forming in July 1806 the confederation of the Rhine. Bavaria, Baden, Würtemberg, Hesse-Darmstadt, and other states placed themselves under Napoleon's protection. The Holy Roman Empire ceased to exist, and on Aug. 6, 1806, the Emperor Francis II. formally renounced his title of German Emperor.

Prussia, however, declared war on Oct. 1, 1806; on the 14th of the same month her army was totally defeated at Jena; on the 25th the French occupied Berlin. England and Russia were alone left unsubdued. Against the former Napoleon issued the famous Ber-lin decree of Nov. 21, 1806, and at the same time prepared to attack the Russians. In February 1807 he fought the battle of Eylau, and on June 15 he won a decisive victory at Friedland. In July the Czar Alexander and Napoleon agreed to the treaties Napoleon agreed to the treaties of Tilsit, which enabled them to dominate Europe. In October 1807, France and Spain agreed to conquer Portugal, and in November Junot entered Lisbon. No sooner had Napoleon made Joseph Bonaparte king of Spain June 1809, then the Spain (June 1808) than the Spanish people rose, and an English expedition landed in Portugal (August), and Wellington won the battle of Vimeiro. The Peninsular war proved one of the principal causes of the fall of Napoleon. War with Austria Napoleon. War with Austria again broke out in April 1809; but after the battles of Aspern and Wagram, the Emperor Francis was forced to sign the humiliating treaty of Vienna (Schönbrunn) October 1809.

In seeking to strengthen his position, Napoleon was led to divorce Joséphine, and in 1810 to marry Marie Louise of Austria. At the same time he made almost superhuman efforts to ruin England by means of his Continental System. But on Dec. 31, 1810, the Czar intimated that he intended to modify his adhesion to the Continental System, and Napoleon resolved to invade Russia. His disastrous campaign to Moscow in 1812, undertaken while he had the Spanish war on his hands, encouraged Europe to rise, and in 1813 the war of liberanisc, and in 1015 the war of libera-tion began. Russia and Prussia joined forces, and though Na-poleon won the battles of Lützen (May 2, 1813) and Bautzen (May 20) the adherian 20), the adhesion of Austria to the ranks of his enemies was followed by the total defeat of the French at Leipzig (Oct. 16-19. 1813). After showing consummate but unavailing skill in the campaign in France during the spring of 1814, Napoleon was forced to abdicate in April, and Louis XVIII. entered Paris. After a short sojourn in Elba, Na-poleon escaped and landed in France on March 2, 1815, and his reign of a hundred days began. The battle of Waterloo (June 18) completed the downfall of his hopes, and he ended his days on

the island of St. Helena. That Napoleon often showed himself in his earlier days kind, generous, and affectionate is undoubted: that he was patient during his last captivity is equally true. His temperament was Italian, his passionate feelings Corsican, but he was by nature neither bloodthirsty nor cruel. The Code Napoléon witnesses to the boldness and clearness of his statesmanship; while, as Marbot tells us, the soldier who understands Napoleon's strategy has nothing more to learn. He waged war on a scale never be-

fore witnessed, and neither France nor any other country has produced a greater military genius. His body was conveyed to France in 1840, and laid in the Invalides in Paris. See Fournier's Napoléon I. (1886-9), Correspondance de Napoléon I. (32 vols.,
1858-70), Rose's Life of Napoleon
I. (1902), Sloane's Life of Napoleon Buonaparte (1896-7), Rosebery's Napoleon: the Last Phase (1900), Lanfrey's The History of Napoleon the First (Eng. trans. 1871-9), Seeley's A Short Life of Napoleon (1886), Lévy's Napoleon Intime (1893), Masson's Napoléon chez lui (Eng. trans. 1894) and Napoléon et sa Famille (1897-1900). and Browning's Napoleon: the First Phase (1905).

Napoleon II. (1811-32), the son of Napoleon I. and Marie Louise, sometimes known as the Duke of Reichstadt is the hero of E. Rostand's play, L'Aiglon (1899). See Wertheimer's The Duke of Reich-

stadt (1905).

Napoleon III. (1808-73), emperor of the French, was the son of Louis Bonsparte, brother of Napoleon 1., and of Hortense Beauharnais, daughter of José-phine. He was born in Paris, On the death, in 1832, of the Duke of Reichstadt, son of Napoleon I., he became the head and hope of the Napoleonic party. An attempt (1836) at Strassburg to head a movement against the government failed, and he was shipped to America. On his reshipped to Europe he settled in London. The publication of the Memorials of St. Helena by Las Casas caused a Napoleonic reaction, and in 1840 Louis Napoleon made at Boulogne a second premature attempt to gain the French throne. Imprisonment in the fortress of Ham followed, but in 1846 he escaped to England. The revolution of 1848 brought him back to Paris, for which city he was elected deputy in the Constituent Assembly of June. In December he was elected president of the democratic republic; but he soon quarrelled with the Chambers, and on Dec. 1, 1851, carried out a coup d'état, overthrowing the constitution. On Dec. 2, 1852, the empire was proclaimed, with Napoleon III. as emperor. Napoleon supported England and Turkey in the Crimean war. A fresh opportunity of embarking on a spirited foreign policy was afforded by the na-tionalist movement in Italy, and, allied with the Sardinians, the French troops in 1859 took a leading part in winning the victories of Montebello, Magenta, and Solferino. But the cession of Savoy and Nice to France, after the treaty of Villafranca (July 9, 1859), showed that Napoleon's motives were purely selfish.



Napoleon and his Staff. From the Painting by Meissonier in the Wallace Collection. (Theology 18: A. Mansell & Co.)

From 1860 to 1870 Napoleon steadily lost ground. Instead of developing a constitutional monarchy, he continued his despotic régime. To strengthen his position, he embarked in the Mexican venture in 1864. He adopted a menacing attitude toward Prussia when news came that a Hohenzol-lern prince had been selected as the future king of Spain. Owing partly to Bismarck's determination, war broke out in August 1870. The French were defeated The French were defeated at all points, and after the battle of Sedan, on September 1, Napoleon surrendered himself to the



Napoleon 111.

Prussians. A republic was declared in Paris, and the Empress Eugénie, whom he had married in 1853, and his son fled to England, where they were joined by the emperor in 1871. He died at Chislehurst in Kent. See Victor Hugo's Histoire d'un Crime (1877); Delord's Histoire du Second Empire (1868-75); Blanchard Jer-rold's Life of Napoleon III. (1874-82); Forbes's The Life of Napoleon III. (1898); I. de St. Amand's Napoleon III. at the Height of his Power (Eng. trans. 1901).

Napoleon, Eugène Louis Jean JOSEPH (1856-79), better known as the Prince Imperial, the only son of Napoleon III, and the Empress Eugénie, was born at Paris. He was present with his father at Saarbrück on Aug. 3, 1870, but saw no more of the war. With the empress he escaped to England, and entered the Royal Academy at Woolwich. On the outbreak of the Zulu war he volunteered his services, and on June 1, 1879, was killed by a party of Zulus. See Barlee's Life of the Prince Imperial (1880), and Martinet's Le Prince Impérial (1895).

Napoleon, PRINCE. See BONA-

Napoleon, Victor Jérôme Frederic (1862). See Bona-PARTES, THE.

Naquet, Joseph Alfred (1834). French scientist and politician, born at Carpentras (Vaucluse); was appointed professor of physics at Palermo in 1863; in 1867-8 he suffered imprisonment on a charge of conspiracy against the emperor; and after the revolution of 1870 was appointed secretary to the Committee of Defence. From 1876 he strove to introduce a law of divorce into France, and a law of divorce into France, and succeeded with the Loi Naquet (1884). As deputy for Vaucluse (elected 1879) he passed over from the party of Gambetta to that of Boulanger. He published Principes de Chimie (1865), Le Divorce (ed. 1881), and Socialisme Collectiviste et Socialisme Libbral (1890) Libéral (1890).

Nara, tn., Hondo, Japan, 25 m. by rail E. of Osaka, was from 709 the first fixed capital of Japan. It has beautiful temples, a Shinto dating from 767, and a Buddhist from 752, also a huge bell, weighing 37 tons (cast in 732), and a gigantic image of Buddha. Fans and toys are manufactured. Pop. (1898) 30,539.

Narainganj, munic. tn., Dacca dist., Bengal, India, 10 m. s.e. of Dacca. An entrepôt for jute. Pop. (1901) 24,472.

Pop. (1901) 24,472.

Narandera, munic. tn., N.S.W.,
Australia, on Murrumbidgee,
Cooper co., 347 m. s.w. of Sydney. The town contains sawmills, flour mill, chilled meat
factory, bicycle factory, breweries, and soap works. Pop. of
bor. (1901) 2,252; of dist. 9,194.

Narasinha, in Hindu mythology the fourth incarnation of
Vishnu, being a form partly of a

Vishnu, being a form partly of a man, partly of a lion.

Naravelia, a genus of tropical climbing plants belonging to the order Ranunculaceæ. They bear

panicles of flowers.

Narbada, or NERBUDDA, sacred riv. of India, rising in the Central Provinces (Rewah state), and flowing s.w. between the Vindhya and Satpura Mts.; after a course of 750 m. it empties into the Gulf of Cambay below Broach, to which (50 m.) it is ascended by sea-going vessels. The upper course is much broken by rapids. Drainage area, 39,000 sq. m.

Narbonne, tn., France, dep. Aude, 8 m. from Mediterranean and 94 m. by rail E.S.E. of Toulouse. It commands the only easily accessible entrance from s.w. France into Spain. Its heather-honey is famous; the town also makes brandy and pre-pares wine. First a Phonician settlement, Narbo Martius became (118 B.C.) a Roman colony, then the capital of Gallia Nar-

bonensis. By deepening and dredging a branch of the river Aude, the Romans made Narbonne a flourishing seaport, and it was the chief Mediterranean harbour of the Visigoths in the 5th century. The expulsion of its industrious Jews by Philippe le Bel in the 14th century ended its career of prosperity. The 13th-century cathedral and town-house (now a museum) are the principal buildings. Pop. (1901) 28,852.



1, Daffodil; 2, N. tazetta; 3, N. poeticus.

Narcissus, a genus of hardy bulbous plants belonging to the order Amaryllidaceæ. They have linear or strap-shaped leaves and usually beautiful flowers, either white or yellow, the perianth tubular below and its segments spreading above, the mouth of the perianth-tube being surmounted by a corona. The genus has been divided into three large groups. (1.) The Magni-Coronati group, made up of those smaller groups which have long crowns or trum-pets. These are the true daffodils, and embrace the trumpet daffodils and the hoop-petticoat daffodils. (2.) The Medio-Coronati group, made up of those which have crowns or cups of

medium size. These are called chalice-flowers or star narcissi.
(3.) The Parvi-Coronati group, composed of those which have short crowns of a flat, saucer-like shape. These are the true narcissi. The poeticus and Burbidgei varieties, with almost all the star narcissi and a few of the stronger daffodils, produce their best results in good, fairly strong, moist loam; the more delicate varieties in a medium soil, inclining to light —sandy, gravelly, or stony. The white trumpet daffodils, with some of the more uncertain kinds of self-yellow daffodils, also the varieties maximus and minor, do best in maiden turfy loam, and soon become diseased in soil that has much humus in it. The white daffodils also do well in soil that has some peat. The best time for planting is late in July or early in August -that is to say, long before most people think of planting their bulbs. The bulbs require lifting and replanting every one to three years. As to growing narcissi under glass, never force them; daffodils detest heat. Plant in August or September in not larger than six or seven inch pots, setting the bulbs rather deep and almost touching one another, and plunge in coal ashes. When the shoots are half an inch long, remove to cold frames, close to the glass. Give plenty of water and of air in open weather, and keep them there until well advanced in bud; then bring them into a cold After flowering, tie up house. the foliage loosely to prevent breakage-the leaf is the life stand the pots closely together out of doors, and water freely until the leaves turn yellow. Plant the bulbs out in June, and they will bloom the next spring.

Narcissus, in ancient Greek mythology, a beautiful youth, who, however, was insensible to the passion of love. To punish him for his lack of feeling he was made to fall in love with his own likeness, and gradually wasted away until he was metanorphosed into the flower called

by his name.

Narcissus Fly (Merodon clavipes), a two winged fly whose larva attacks the bulbs of daffodils, introduced into N. Europe about 1840. It is about a third of an inch in length, much like a bumble-bee in form, and more or less black in colour, but often spotted with yellow, red, or white. It emerges from the pupal stage usually in May, and lays its eggs in June or July. The larvæ eat their way into the bulbs, and only leave them by other holes when they are fully grown and ready to bury themselves in the ground, there to undergo the next metamorphosis. Hand-pick-

ing of the bulbs during the first three weeks of August will tend to diminish the pest, and many of the flies may be caught and killed in May and June with a butterfly net, when they settle. The chrysalids should also be removed from the soil just before the plants flower, as at that time they lie near the surface of the ground. Plates of treacle, with the edges smeared with honey, will also trap them.

432



Narcotics, in medicine, those drugs which induce a deep sleep, practically stupefaction, ending in death if the dose be extreme. Opium and its alkaloids, alcohol, chloral, belladonna, and Indian hemp (Canuabis indica) are examples. Some, such as alcohol, opium, and Canuabis indica, are stimulant in small doses and at first.

Narcotine, C₂₂H₂₃NO₇, an alkaloid occurring in opium. It forms shining prisms on crystallization from alcohol, is decomposed by water into meconine and cotarnine, and is a derivative of benzyl-iso-quinoline. It has been employed in the treatment of ague.

Nardo, tn., prov. Lecce, Italy, 25 m. w. of Otranto. Pop. (1901) 14,208.

Nardoo (Marsilea macropus), a pseudo-fern with a creeping rhizone and erect fronds, circinate when young. The spores and spore-cases are pounded and made into bread or porridge by the aborigines of Australia. The plant grows mostly in swampy ground.

Nares, SIR GEORGE STRONG (1831), British vice-admiral, was born in Monmouthshire. He took part in the Franklin search expedition of 1852-4, and commanded the Challenger in the earlier part of her scientific expedition of 1873-6. He is the author of Seamanship (7th ed. 1897), Reports on Ocean Soundings and Temperature (6 vols. 1874-5), Official Report of the Recent Arctic Expedition (1876), and Narrative of a Voyage to the Polar Sea (1878).

Nariad, chief tn., Kaira dist., Bombay, India, 29 m. s.e. of Ahmadabad. Pop. (1901) 31,435. Narni, tn., prov. Perugia, Italy, 45 m. by rail N. of Rome; has mineral springs, and has been

has mineral springs, and has been a bishop's see for over fifteen centuries. Its cathedral dates from the 13th century. The Emperor Nerva and Pope John XIII. were natives. Pop. (1901) 12,773.

Narses (?472-568 A.D.), general and statesman of the later Roman With Belisarius he reempire. lieved Ariminum; but not long after the two quarrelled and separated, and Narses was recalled. In 551 he was again sent to Italy, and defeated the Gothic king, Totila, in July 552, and retook Rome; and in the next year he destroyed the army of the new Gothic king, Teias, on the Sarnus. Next an invading force of 75,000 Alemanni and Franks, which descended from the Alps, was cut to pieces by Narses, and Italy was once more made a province of the Roman empire. Narses was appointed its governor, and took up his residence at Ravenna. In 563 he suppressed a revolt in Verona and Brescia. When Justin dismissed him, he invited the Lombards to invade Italy, but died of remorse. The dates make it appear that Narses died at the age of ninety-five, after achieving his greatest exploits when he was over seventy years of age. Gibbon doubts this. Narses was a eunuch.

Narsinghgarh, feudatory state under Bhopal agency, Central India. Area, 623 sq. m. Narsinghgarh, the capital, is 20 m. N.N.W. of Bhopal. Pop. (1901) 8,778.

Narsinghpur, feudatory state of Orissa, Bengal, India. Area, 199 sq. m.; pop. (1901) 39,613. Narsinghpur, the chief town, lies 20 m. N.W. of Bhopal.

Narsinghpur, chief tn., Narsinghpur dist, Central Provinces, India, 50 m. sw. of Jahalpur; entrepôt for grain and cotton. Pop. (1901) 11,233. The district, which includes upper half of Narbada valley, has an area of 1,916 sq. m., and a population (1901) of 313,951.

Narthex, the term applied in Byzantine architecture to the porch in churches of the early Christian and mediaval periods. It was in two sections, one section being without, the other within, the main wall of the church. It was to the narthex alone that penitents were admitted.

Narva, tn. and port, St. Petersburg gov., N.W. Russia, 86 m. s.w. of St. Petersburg city. The 14th-century castle has been converted into arsenal and barracks, and amongst other buildings are the Orthodox cathedral and the 'house of Peter the Great,' now a museum. Cotton is manufactured. The fisheries (salmon and lamprey) are valuable. Imports (1905) £581,000; exports, £156,200. Pop. (1897) 16,577.

Narvaez, Panfilo DE (c. 1470-1528), Spanish soldier, took part in the conquest of Cuba (1512); failed in an expedition to Mexico to reduce Cortes to obedience

(1520); but in 1526 received a commission to conquer and rule over the territory reaching from Florida to the Rio Grande. After a march of great hardship through hostile territory he failed to find his ships, and was drowned in the

Gulf of Mexico.

Narvaez, RAMON MARIA, DUKE of Valencia (1800-68), Spanish statesman and soldier, born at Loja (Andalusia); sided with the Liberal party in 1822. He fought against the Carlists, defeating Gomez in 1836. In 1843 he sucdefeating ceeded in supplanting his rival, Espartero, as head of the government, and was created Duke of Valencia in 1844. His policy was one of reaction, and he crushed with great severity the insurrections of the time. Deprived of his office in 1846, he resumed it in 1856 7; and again held power in 1864-5, and 1866 until his death, O'Donnell being then his chief rival.



Narwhal.

Narwhal (Monodon monoceros), one of the toothed dolphins peculiar to the Arctic region. The animals appear to feed on the animals appear to loca on cuttles, small crustaceans, and fish. They occur in small schools. The head is blunt and rounded, the back fin absent, the flippers short and wide. The colour is a dusky and mottled gray above, and white below, while the total length varies from twelve to six-teen feet. The tusk is nearly always developed on the left side, the corresponding tooth of the right side being rudimentary, and concealed within the jaw. The tusk is composed of pure ivory (dentine), and may reach a length of eight feet. In the female both tusks are in the rudimentary condition. Narwhals are hunted both for the sake of their ivory and for the oil, which

is of excellent quality.
Narynsk, tn. and fort, Semiryechensk prov., Russian Central Asia, 66 m. from Russo-Chinese frontier, on river Naryn or Upper Syr Daria. It commands the easiest route, by Terekti pass, between Russian Central Asia and

Nascent State. Elements exhibit greater chemical activity at the moment of their liberation from compounds than at other times. Thus hydrogen, when set free by the action of zinc on hydrochloric acid in the presence of ferric chloride, reduces it to ferrous chloride, Zn + HCl = $ZnCl_2 + 2H$, and $FeCl_3 + H =$

FeCl₂ + HCl, although hydrogen gas, bubbled through the solution, is unable to bring about the same change. This is thought to be due to the fact that the hydrogen at the moment of its liberation exists in single atoms, which are thus more capable of entering into reaction than when they have united among themselves to form the double-atom molecules of which hydrogen gas is believed to consist. See MOLECULE.

Naseby, par., Northampton-shire, England, 12 m. N.E. of Rugby. Here, on June 14, 1645, the Royalists were defeated by the Parliamentarians under Fair-

fax and Cromwell.

Nash, JOHN (1752-1835), British architect, was probably born at Cardigan, Wales. Besides designing many country mansions, he made extensive alterations in the London streets. Regent Street, Regent's Park, and much of the district were planned by him; he also converted Buckingham House into Buckingham Palace, origi-nally intending for it the arch now known as the Marble Arch, Hyde Park. The Brighton Pavilion was also his work. His individual designs lacked breadth and origi-

nality, but are somewhat redeemed by their grouping.
Nash, RICHARD (1674-1762), known as 'Beau Nash,' was born at Swansca, and became a gambler. Going to Bath in 1705. he built an assembly hall, organized the amusements, put a stop to duelling, and established himself in a position of unquestioned social absolutism, which won for him the name 'King of Bath.' He was noted for the excellence of his manners and taste, as well as for his extravagance. See Life

by Goldsmith (1762).

Nash, Thomas (1567-1601), English poet and pamphleteer, was the son of a Lowestoft minister. In 1588 he came to London, shared the riotous life of Robert Greene, and picked up a living with the help of a versatile pen, and the occasional patronage of Lord Southampton and others. He wrote against the Puritans in the Mar-Prelate controversy, and waged a private foul with Gabriel Harvey, the personification of Cambridge pedantry. Ultimately both Nash's and Harvey's books were suppressed by the archbishop of Canterbury. 1597 Nash was committed to the Fleet, owing to the offence given by his play, now lost, of the Isle of Dogs. Chief works: Anatomic of Absurditie (1589); Pierce Pennilesse, his Supplication (1592); Apologie of Pierce Pennilesse (1593); The Unfortunate Traveller, or the Life of Jack Wilton (1594; ed. E. Gosse, 1892); Have with you to Saffron Walden (1596); Summer's Last Will and Testament (acted 1592, printed 1600), Collected Works, ed. A. B. Grosart (1883-5),

and R. B. M'Kerrow (1904).

Nashua, city, New Hampshire, U.S.A., co. seat of Hillsboro co., on Merrimack R., 32 m. s. of Concord. It manufactures cotton goods and carpets, and has iron works. Pop. (1900) 23,898.

Nashville, cap. of Tennessee, U.S.A., co. seat of Davidson co., on Cumberland R. It is the scat of Vanderbilt University, the University of Nashville, the Fisk University, and the Roger Williams University. Here, in 1864, the Federals won a victory over the army of Tennessee. Pop. (1900) 80,865.

Nasica. See Scipio.

Nasik (Nasica of Ptolemy), cap., Nasik dist., Bombay, India, on r. bk. of Godavari, 89 m. N.w. of Ahmadnagar. Chief manufactures, brass and copper ware. The town is a resort of Hindu pilgrims, almost rivalling Benares. In the vicinity are the Lena Caves, with rude sculptures. Pop.

Caves, with rude sculptures. Pop. (1901) 21,490. Area of dist. 5,940 sq. m. Pop. (1901) 816,504.

Nasirabad. (1.) Or Mamansungh dist., Bengal, India, 74 m. N. of Dacca, on the old channel of the Brahmaputra. Pop. (1901) 14,668. (2.) Chief tn., Khandesh dist., Bombay, India, 120 m. s.w. of Indore: manufactures glass of Indore; manufactures glass bangles. Pop. (1901) 12,176. (3.) Town and cantonment, Ajmere-

Merwara, Rajputana, India, 14 m. s.e. of Ajmere.

Nasmyth, ALEXANDER (1758-1840), Scottish landscape painter, born in Edinburgh; studied under Runciman and Allan Ramsay, with whom he went to London. From 1778 he practised por-trait-painting in Edinburgh, but achieved his greatest success in landscapes. Wilkie considered him the founder of the Scottish school of landscape - painting. The one authentic portrait of Burns is by him (Edinburgh National Gallery). He invented the bow-and-string' type of bridge constructed at Charing Cross and at Birmingham railway stations.

Nasmyth, JAMES (1808-90), Scottish engineer, inventor of the steam-hammer, was born in Edinburgh, the son of Alexander Nasmyth, painter. After acting as assistant to Henry Maudsley in London (1829-31), he founded, in 1834, a business at Manchester, which afterwards grew into the Bridgewater foundry. The steamhammer, invented in 1839, was not patented until 1842, the design having been already appropri-ated and patented in France by Schneider, proprietor of the Creuzot iron works. In 1858 he published Remarks on Tools and Machinery. See his Autobiography (ed. Smiles, 1897). Nasmyth, Patrick (1787-1831), Scottish landscape painter, was born in Edinburgh. He exhibited at the Royal Academy in 1811, and earned for himself the name of the English Hobbema. He painted with his left hand, and 'painted by preference the footpaths, hedges, commons, pasturegrounds, and dwarf oaks of the outskirts of London.' Both father (Alexander) and son are well represented in the Edinburgh National, the Glasgow Municipal, and the Tate (London) galleries.

Nassau. See Bahamas.
Nassau, formerly an independent duchy of Germany, incorporated with Prussia in 1866. It comprised an area of 1,830 sq. m., and had (1865) 465,636 inhabitants. After the death of Henry the Rich the territory was divided (1255) between his two sons, Walram II, and Otto. The former is the founder of the present family of Nassau, while the descendants of Otto founded the house of Orange-Nassau. Napoleon I. reunited the lands in 1806, and bestowed the title of duke upon Frederick William. See further under Orange.

Nast, Thomas (1840-1902), illustrator and caricaturist, was born at Landau, Bavaria. After executing sketches when with Garibaldi's force in Italy (1860-1), he produced vigorous cartoons on the civil war in America, then pictorial assaults on Tammany. He also illustrated books, and in 1873 began a successful career as a lecturer, illustrating his topic by rapid sketches, and later by oil paintings.

Nasturtium, a genus of hardy cruciferous plants, generally bearing yellow or white flowers. The most familiar species is the water-cress (N. officinale). See also Trop-Ecolum (Indian cress).

Natal, a British first-class armoured cruiser of 13,660 tons, launched in October 1905. The name was chosen because the colony of Natal now contributes towards the naval expenses of the mother country.

Natal, so called from its discovery on Christmas Day (die Natali), 1497, a British colony on s.E. coast of Africa. On the w. the Kwathlamba or Drakenberg Mts. separate it from Basutoland and the Orange River Colony. The Dutch attempted unsuccessfully to colonize Natal early in the 18th century, and were followed by the British in 1823. The English colony was, however, broken up in 1828 by Dingaan, king of the Amazulus. In 1836

Dingaan granted a concession of land, and a British colony was formed at Durban. The Boers first entered Natal from Cape Colony in 1835, and after defeating the Zulus attempted to es-

tablish a republic; but this was resisted by the British, and ulti-mately, in 1843, the country was annexed to Cape Colony. Natal was made an independent colony in 1856. In 1879 came the war with Cetywayo, king of the Zulus, who was defeated and captured; and in 1897 Zululand was annexed to Natal. In 1881 the Transvaul Boers invaded the colony, and defeated the British at Majuba Hill. In the war of 1899-1902 Natal was the scene of the most obstinate and sanguinary fighting. (See South African War.) After the war, Utrecht, Vryheid, and part of Wakkerstroom were taken from the Transvaal and added to Natal. Zululand and Amatongaland now consti-tute a province of Natal. Total area of Natal, about 44,000 sq. m. In 1906 a rising of the Zulus occasioned considerable anxiety until suppressed by force. As contrasted with the Cape Colony, especially the W. and interior regions, Natal is a well-watered land. On the w, lies the mountain barrier of the Drakenberg, throwing out lateral ranges such as the Biggarsberg, and crossed at Schiet Nek, De Beers Pass, and Van Reenens Pass. The highest peaks are Champagne Castle (10,357 ft.), Mont aux Sources (10,000 ft.), Giant's Castle (9,357 ft.). As these mountains lie parallel with the coast and at no very great distance from it, the river courses descend quickly; and if a thunderstorm breaks upon the Biggarsberg or the Drakenberg, its results are soon seen in such deep beds as those of the Klip, Buffalo, and Tugela. At Port Natal the 'bar' has been an obstacle to ships, and has only been deepened by constant dredging and by utilizing the scour of the tide. The surface of Natal is broken and varied. In the coast region, reaching from 25 to 30 m. inland, tropical agriculture prevails-e.g. the sugar-cane, coffee, tea, and cotton. In the middle district, along cooler levels, the British styles of farming and grazing prevail. A third district is along the plateaus of the interior, with sheep runs. The production of wheat is limited to the Upper Tugela districts and the country round Dundee and Estcourt. In 1904 the white or European population was 97,109; Indians and Asiatics, 100,918; natives, 910,727; total, 1,108,754. Kaffir corn and the sweet potato are the chief native articles of diet.

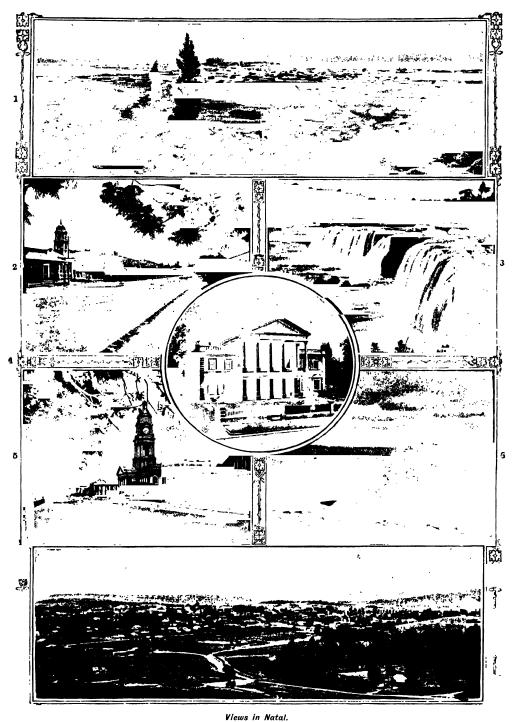
The main industries of Natal are agricultural and pastoral. Sugar, maize, wheat, and oats are largely grown. Horse-breeding is carried on in the upper districts. The coal fields near Newcastle and Dundee yielded 1,129,407 tons in 1905; part of

Natal's naval contribution consists of Natal coal at the port. By far the greatest portion of Natal trade is with the United Kingdom. In 1905 the sea exports (Angora hair, hides and skins, sugar, coal, wool, and gold) were valued a £2,273,522, and the imports (clothing, leather, grain, iron and steel goods, machinery, railway material, wines and railway material, spirits, cottons and woollens) at £10,673,943. Britain received £10,673,943. Britain received goods to the value of £1,230,200 (chiefly wool, hides, bark, coffee). and supplied goods to the value of £6,326,284 (chiefly articles mentioned under general imports). For 1904 the revenue (railways, customs, excise, stamps, and licences, including native hut tax, post-office and telegraphs, chiefly) was £4,160,145; the expenditure (railways, public works, etc.) was £4,071,439. The public debt amounted to £16,019,143.

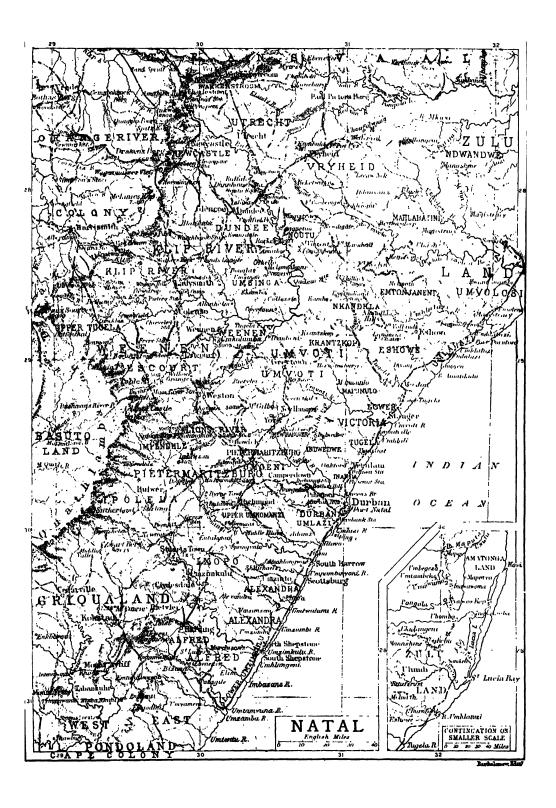
In 1904 there were 776 m. of railway in the colony, most of the lines being worked by government. Along the coast of Natal there is a railway running to Verulam (19 m.), and to the Tugela (70 m.). Another coast line runs s. from Durban to Isipongo (11 m.), and to Park Rynie (41 m.). There is also a branch from the main line to Richmond and Greytown, the latter place near the Umvoti coal fields, 65 m. from Pietermaritzburg. A new con-Pietermaritzburg. nection with Care Colony is being quickly pushed forward, and the first section is open for traffic. The Natal roads maintained by the government and not under the local boards are well kept, and extend over a mileage of In 1904 there were in

Natal 1,793 m. of telegraph.
Since 1893 Natal has been under a responsible government, at the head of which is the governor, appointed by the crown. There are a Legislative Council of twelve members, elected under a high property qualification, and sitting for ten years; and a Legislative Assembly of thirty-nine members, also elected under a property qualification, and sitting for four years. The suffrage is the natural right of all men over twenty-one years of age possessing immovable property of the value of £50, or who rent any such property of the yearly value of £10, or whose income is equal of £10, of whose income is equal to £8 a month. Before acquiring the suffrage a three years residence is necessary. Natives are debarred from the franchise except under certain qualifications.

There are eight counties in Natal—viz. Durban, Alexandra, Alfred (including Lower Umzimkulu), Pietermaritzburg, Victoria, Umvoti, Weenen, and Klip River. In addition to these must



Durban, from top of Berea.
 A Street in Ladyanith.
 Tugela Falls, near Colenso.
 House of Parliament, Pietermaritzburg.
 West Street and Town Hall, Durban.
 Majuba Ilill.
 Pietermaritzburg, from the east. (Photos by G. W. Wilson.)



be reckoned the province of Zululand and Amatongaland, Utrecht, Vryheid, and part of Wakker-

stroom.

Natal law is based on English law, and differs somewhat from the system in vogue at the Cape, which is based on the Roman-Dutch law. The supreme court of Natal sits at Pictermaritzburg. In 1899 the jurisdiction of the supreme court was extended over Zululand and Amatongaland.

Natal has adopted universal conscription, all colonists between the ages of sixteen and sixty being liable to be called out on active or defensive service. The military obligation resembles that of the old Boer commando rather than the conscription which prevails on the Continent. The Christian population is represented (1) by the Church of England, with a bishopric at Pietermaritzburg; (2) by the Roman Catholics, of whom the Trappists are particularly active at Marianhill, near Pinetown; and (3) by the Wesleyans, a numerous and powerful denomination. There are also Baptists. Presbyterians, and Independents. The educational system provides for the education not only of Europeans, but also of Indians Natal, by W. Holden (1855); The Colony of Natal, by R. J. Mann (1859); Natalia, History of Natal, by Ingram (1897); Notes on Natal, by Peace (1893); Annals of Natal, by John Bird (1888); Natal, the Land and its Story, by Robert Russell (ed. 1900); Guide to South Africa, ed. by Samler Brown and Gordon Brown (1900-1).

Natal, cap. of prov. Rio Grande do Norte, Brazil, 2 m. from mouth of Rio Grande, with cotton mills. Pop. 60,000.

Natalie (1859), queen of Servia, the daughter of a Russian officer. She married in 1875 King Milan of Servia, and became the mother of Alexander, king of Servia, who was assassinated in June 1903. The king and queen were divorced in 1888. After the assassination of her son she was forbidden to re-enter Servia.

Natchez. (1.) City, Mississippi, U.S.A., co. seat of Adams co., on the Mississippi, 280 m. above New Orleans, has a trade in cotton. It was shelled in 1862 and 1863 during the civil war. Pop. (1900) 12,210. (2.) A North American nation, whose original territory extended along the Gulf of Mexico between Mobile and the Mississippi. They were nearly exterminated by the French in 1730. The Natchez language has been long extinct.

Natick, tn., Middlesex co., Massachusetts, U.S.A., near Charles R., 17 m. w. of Boston, manufactures boots, shoes, and base-balls. Pop. (1900) 9,488.

National Anthems. The British God save the King is assigned to John Bull (1563-1628) and to Henry Carey (1692-1743), but probably was evolved earlier from some old folk song. It first became popular in 1745 as a protest against the Jacobites. air was adopted by the Danes (1790), by the Prussians as Heil dir im Siegerkranz (1796), by the Americans (1832) as My Country! 'tis of thee; and is also sung by the Swiss. Other national anthems are the French Marseillaise, by Rouget de Lisle (1792); Austrian, God save our gracious Emperor, by Zedlitz and Haydn (1797); Hungarian, Bless our Land with Gladness, by Erkel (1810-93), and the Rakotzy march; Greek, Sons of Greece, Arise! (18th century); Russian, God, the All-terrible, by Lvov (1830); Polish, Poland is not lost for ever, and Dombrowski's March (1811 - 12); Italian, Garibaldi's Hymn (1859); Dutch, Oh ye within whose burning reins (1830); Belgian, La Brabanconne (1830). The United States contributes Hail, Columbia (1798); Canada, The Maple Leaf for ever, by Muir (1871); New Zealand, God girt her about with the Surges, by Reeves; and Japan, Man our Lord [Mikado] for ever reign.

National Artillery Association, formed in 1861 for the promotion of artillery. The government allows a capitation grant for every member complying with certain conditions, and also ammunition for practice. The annual meeting takes place at Shoeburyness in September, when a camp is formed of volun-

teer artillery.

National Association for Employment of Reserve Soldiers. See EMPLOYMENT OF DISCHARGED SOLDIERS.

National Council of Evangelical Free Churches, a body formed in 1896 to facilitate intercourse among the various denominations represented, etc. These are the Congregational, Baptist, Presbyterian, Methodist of all sections, the Society of Friends, the Free Episcopal Friends, Church of England, and several unattached missions. The tenth annual council was held at Manchester in 1905. The organs of the movement are the Free Church Chronicle, the Free Churchman (both monthly), and the Free Church Year Book.

National Cyclists' Union, an association of British cycle clubs formed in 1878—(1) to secure a fair and equitable administration of justice as regards the rights of cyclists on public roads; (2) to watch the course of any legislative proposals affecting the interests of the cycling public; (3) to consider the existing re-

lations between cyclists and the railway companies, and to secure a modification of the tariff; (4) to examine the question of cycleracing in general, and to frame definitions and recommend rules on the subject, and to arrange for annual race meetings, at which the amateur championship shall be decided.

National Debt. The system of public indebtedness has been the creation of the last two hundred years. Britain led the way in the establishment of a national debt. After the revolution of 1688 the needs of the new government compelled it to apply for aid to the moneyed class; and as the older plan of temporary borrowing on the king's personal credit, by pledging his jewels or the persons of his friends' (Stubbs), was obviously inadmissible, the funding system. based on parliamentary sanction, was the instrument employed. The credit of the nation, or 'public,' replaced that of the king. Each great war has since then added to the amount of the national debt.

As to the form of borrowing, the varied methods of annuities. tontines, and floating debt were gradually set aside for that in which stock is issued without any date being fixed for repayment, but is always redeemable at the pleasure of the state. Closely connected is the merging of small loans charged on specific public funds into a general or consolidated stock (hence the name 'consols'), having its guarantee in the whole public revenue. Special reasons may account for guaranteeing lenders against repayment for a term of years (as in the existing British consols'), or for arranging for periodical redemption of portions of British experience, supported by that of other countries, is, on the whole, in favour of the single 'perpetual' debt. Those loans have been most successful and least burdensome which were issued as nearly as possible at their par, or face, value. One of the worst faults in the loans of the 18th century, and particularly those of Pitt, was the issue of 3 per cent. stock at a price much under its nominal value. Little was gained in respect of lower interest, while the future capital repayable was in some cases more than doubled. and the important agency of conversion made ineffective. A loan may be issued through a syndicate, or be open to public subscription at a fixed rate. The last appears to be the best in the state's interest and the fairest to

A much graver question—indeed the most fundamental of

all-in respect to a national debt is the expediency of incurring it, and its allowable extent. On no economic subject has there been a sharper division of opinion. In its earlier development the national debt was regarded as ruinous by Hume and Adam Smith; in the 19th century, Chalmers and J. S. Mill argued that borrowing was unnecessary, and involved double sacrifice for opposition. A great mass of practical authority has upheld the loan system as unavoidable and at times highly expedient. Put shortly, the contention of Hume and Smith was that the unchecked growth of public debt amounted to a mortgage which would ultimately outrun the national wealth. If debt steadily increases, it must in the end become too heavy for the nation; an argument strictly true, unless we assume a parallel growth in the national income and wealth. The force of Mill's objection lay in his assertion that the total expenditure came in any case out of the annual produce. By borrowing, its weight was placed on the labourers (through the diminution of the capital that employed them); by taxation, it was distributed through the community. In fact, this view was not at any time well founded: but with the formation of the modern international loan market it has lost any force that it might have possessed.

The true objection to extensive borrowing is the strain that it places on the financial system of the future. A loan is anticipated revenue; its proper function is to give a more even distribution of the cost of the state in reference to time. It is, therefore, limited in extent by the consideration that each period has its own charges to bear. Hence the following rules as to the use of borrowing may be deduced: (1) Ordinary expenditure or small additional charges should be met out of revenue; (2) heavy extra-ordinary expenditure not likely to recur is best met by a loan for a short term; (3) an increase of expenditure which will probably continue for some time is best defrayed by increasing taxation, with the assistance of loans for the earlier years; (4) industrial revenue-yielding outlay should be met by borrowing. It must, however, be remembered that the purely financial conditions are often subordinated to political and party considerations. rowing may ward off the discontent that would follow heavy taxation, or the productiveness of the tax system may have reached its limits, though the needs of the state are increasing. The duty of the financial

administration is to secure the best terms for the state by lightening the pressure of debt, and at the same time to observe full faith with the public creditors. To borrow at the lowest rate of interest, and (unless substantial advantage is gained by guaranteeing against repayment for a time) to preserve freedom of redemption, are rules following from this principle. As soon as the market price of stock exceeds par, the opportunity for its 'conversion' into a new stock at lower interest is open—an expedient often employed in Britain from its first use, in 1716, down to the great Goschen conversion of 1888, by which £558,000,000 of 3 per cent. stock was lowered to 21 per cent., with a further reduction to 21 per cent. in 1903.

No matter how well administered, a public debt, so long as it exists, involves the charge of interest and management. (For the funded debt this amounted to nearly £16,000,000 for the year 1905.) Accordingly the question arises. When the need for borrowing has ceased, should repayment of debt be under-taken? Common sense and financial principle agree in giving an affirmative answer. One strong reason for trying to reduce the burden is that scope may be secured for further borrowing should the emergency recur. If debt is never redeemed, the resources of the state will be more and more limited as each period of war or other extraordinary demand comes. But acceptance of the general rule, that debt should be redeemed, does not help much in dealing with the more concrete questions of the method and amount of repayment at any given time. One definite proposition may indeed be laid down: 'The excess of revenue above ex-penditure is the only "means" by which public debts can be dis-charged' (Hamilton). Any contrivance, no matter how ingenious. which ignores or evades this prerequisite condition, may be at once condemned as illusory. Such was the defect in the once famous sinking-fund plan of Price adopted by Pitt in 1786. It was based on the plan of setting aside to accumulate at compound interest a sum which would ultimately extin-guish the debt. What might have been in some cases a convenient method was exalted into a magical device that really encouraged further borrowing and increased management expenses. This delusion responsible for much of the debt incurred between 1793 and 1815, and it only disappeared under the criticism of Hamilton and Ricardo. When the necessity of a real surplus for the payment

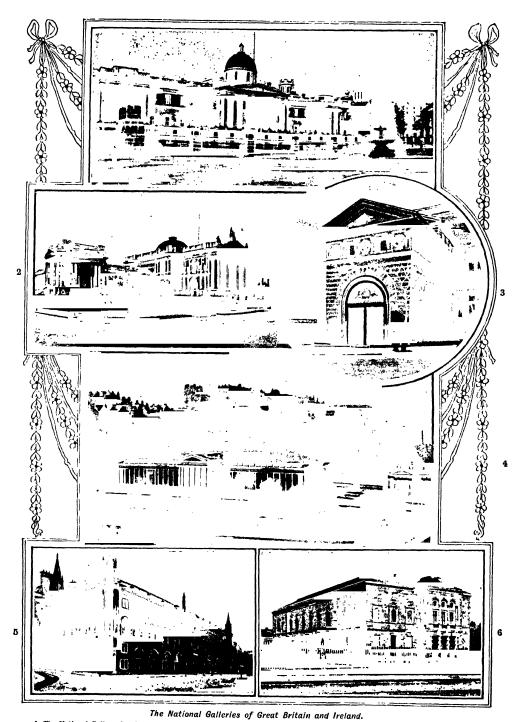
of debt is recognized, the most direct way is to apply the annual excess of revenue over expenditure, as is done in the existing 'old sinking fund.' Thus a definite sum—as the £5,000,000 proposed to be set apart in 1819 may be annually devoted to this end, and the revenue kept up to that point. Another plan, much favoured by Gladstone, is to turn a part of the debt into terminable annuities, in which the annual charge is partly payment of capital, and when a batch of annuities falls in to repeat the process. Finally, a fixed amount may be set apart for the debt charge considerably exceeding the interest and management expenses; the balance will go for debt redemption, and as time goes on this lart of the fund will increase through the reduction of interest from redemption. Such was the new sinking fund of Sir Stafford Northcote (1875). Each of the foregoing methods may prove serviceable in special cases; for Britain, the terminable annuities and new sinking fund have been most effective.

The real pressure involved in the existence of a debt has also been much discussed. The best measure is clearly the ratio of the debt charge to the annual income of the country. This is preferable to the comparison of debt principal with national wealth, as it includes all the earnings of the community.

Estimates of the total national debts of the world can only be approximations. The European debts in 1870 were about £3,000,000,000; in 1885 they were £4,600,000,000; in 1900, owing to reductions in the interval, the debts of the European states and United States of America only exceeded £4,000,000,000. A careful estimate placed the world's debt in 1890 at £6,500,000,000; £7,500,000,000 would not be excessive for 1900. In amount, the French debt is by far the highest; it nearly touches £1,250,000,000. The United States funded debt was only £180,000,000 in 1904, together with a floating debt of nearly £80,000,000. The growth of the British debt is shown in the following table:—

Year.	Amount.
1697. Peace of Ryswick	£21,500,000
1713. Treaty of Utrecht	53,680,000
1748. Close of war of Austrian	
Succession	78,300,000
1763. Close of Seven Years' war	136,000,000
1783. Close of American war of	
independence	238,000,000
1802. Peace of Amiens	537,500,000
1815. End of Napoleonic wars	876,000,000
1856, Close of Crimean war	808,100,000
1899	635,040,000
100K	700 -00 Out

Bibliography.—Sinclair's History of the Public Revenue, vol. iii., gives the history of the ear-



1. The National Gallery, London. 2. National Gallery of British Art (Tate Gallery), London. 3. Entrance, National Portrait Gallery, London. (Photos by Barnard.) 4. National Gallery, Edinburgh. (Photo by Frith.) 5. National Portrait Gallery, Edinburgh. (Photo by Lawrence.)

lier British debt. Special works are: B. Hamilton's An Inquiry are: B. Hamilton's An Inquiry Concerning . . . the National Debt of Great Britain (1813), Ricardo's Essay on the Sinking Fund (1820), H. C. Adams's Public Debts (1888), and E. A. Ross's Sinking Funds (1892). A standard German work is Nebenius's Der öffentliche Kredit (2nd ed. 1829). Full details of the growth of the British debt are given in a parliamentary return of 1869. On the Goschen conversion, see E. W. Hamilton's Conversion and Redemption (1889).

National Defences, ADMIS-SION TO. No pass to enter de-fence works is issued, unless under very exceptional circumstances, to any one not a British subject, and even then it does not admit to such places as positionfinding cells, submarine mining buildings, torpedo buildings, magazines, or storehouses. An officer of the army or navy when in uniform is entitled to enter all defence works without a pass, except the special buildings already

mentioned.

National Galleries. The London National Gallery was begun (1824) by the acquisition of the Angerstein pictures, which in-cluded seven Hogarths (Marriage val, three Claudes, and Titian's Venus and Adonis. To these were added the following collections: Beaumont (1826); Wilkie, Blind Fiddler; Carr (1831), David in the Cave of Adultan; Claude; Olney (1837); Farnborough (1838); Vernon (1847); Turner (1856); Bell (1859); Dignity and Impudence, by Landseer; Peel (1871); Wynn Ellis (1876). In 1838 the gallery contained 150 pictures; in 1893, 1,400; and now more than 1,650, of which about 1,100 are in Trafalgar Square, the rest at the Tate Gallery, London, and elsewhere. The sum expended on 610 purchases amounts to £603,853, averaging £995. In 1884 Raphael's Madonna degli Ansidei was bought from the Marlborough Collection for £70,000 - the largest sum ever given for a picture; Van Dyck's Charles I. for £17,500. The most precious Veronese in the world, The Family of Darius, cost £13,650. In 1890 £50,000 was given for three portraits by Moroni, Velasquez, and Holbein. In 1906 the Velasquez Venus, formerly in the Rokeby Collection, was purchased for £45,000. The present building greated The present building, erected (1832-8) at an original cost of £96,000, was enlarged in 1860, 1876, and 1887.

SCOTTISH NATIONAL GALLERY, built (1850 8) from Playfair's design (Ionic), cost £40,000, and contains Mrs. Graham (Gainsborough), and fine specimens of Van Dyck, Raeburn, Greuze, Watteau, and Etty.
The Dublin Gallery is small

but choice.

Of foreign galleries, those of Florence (Pitti and Uffizi Palaces) are the largest; the Louvre (Salon Carré) the most accessible; Dresden has the most famous picture-Raphael's Sistine Madonna; Madrid is famed for Velasquez; Berlin, St. Petersburg, Munich, Rome and other Italian cities, have splendid collections.

See National Gallery, by Poynter (3 vols. 1900-1), reproducing every picture in the National and Tate Galleries; National Handbook by Cook (1902); and Addison's Art of the National

Gallery (1905).

National Guard, an armed force of citizens for local defence, under the control of the municipality to which they belong, and in force in Italy, Greece, and especially France, where the historical National Guard was enrolled on the day before the taking of the Bastille at the time of the revolution. On June 12, 1790, the National Assembly decreed that it was necessary to be a member of the National Guard in order to enjoy the rights of citizenship. In 1791 the National Guard was first organized by law. The guards were dissolved in 1827, but revived in 1830, and abolished in 1872.

National Liberal Federation, a union of Liberal associa-tions founded at Birmingham on May 31, 1877. The objects of the federation are: (1) to assist in the organization throughout the country of Liberal associations based on popular representation; (2) to publish literature, to promote meetings and provide speakers and lecturers, to help in securing parliamentary candidates, and otherwise to assist Liberal associations in their work; and (3) to ascertain and give expression to the opinions of the Liberal party, and generally to promote the adoption of Liberal principles in the government of the country. The metropolitan constituencies are organized under the London Liberal Federation, those of the home counties' under the Home Counties Liberal Federation.

National Physical Laboratory, THE, was opened in 1902. with the object of assisting industries. Its principal operations consist in determining standards -i.c. of length, mass, electrical resistance, temperature, and so forth; in testing and comparing measuring instruments with the standards, and in testing materials that may be required for commercial or scientific purposes; and in making researches on processes. The laboratory for physical and engineering test and research is situated at Bushy House, Teddington, Middlesex; and the observatory department, where the meteorological, magnetic, and seismological observations, and the testing of barometers, meteorological instruments, and watches, are carried out, is at Richmond, Surrey.

National Portrait Galleries. The one at London was founded in 1856, and is now housed in a building given by W. H. Alex-ander, designed by Christian, and erected (1890-6) to the north-east of the National Gallery. The upper rooms, arranged chronologically from Richard 11. (1366-40), contain portraits of the different dynasties, and include Henry IV., Chaucer, Edward III., the Chan-dos, Shakespeare, Cromwell, and the Pretenders. The lower rooms contain groups of statesmen, divines, and others, and a picture of the Reform Parliament (1832) with 370 portraits. Van Dyck, Reynolds, Gainsborough, Romney, Raeburn, Lawrence, G. F. Watts, and other masters, are represented.

SCOTTISH NATIONAL PORTRAIT GALLERY, Edinburgh, built by the late J. R. Findlay of The Scotsman at a cost of £60,000, is a Gothic building in 14th-century style. It contains many portraits of the royal Stuarts, and of Wishart, Argyle, Claverhouse, Burns, Scott, Carlyle, Chalmers, and many other notable Scotsmen, painted by leading Scottish artists from Jameson to Raeburn, and from Racburn to Reid.

National Reform Union, an association formed in 1864 for the purpose of promoting politi-cal reform, and reorganized at a conference held at Manchester in 1875. Its objects are the dissemination of political knowledge by lectures and literature, the promotion of Liberal organization, and the agitation of any burning question. It has over four hundred affiliated branches, in all parts of the country.

National Review, THE, founded in 1883 to supply the demand for an exclusively Conservative review. It was edited until 1893 by Alfred Austin, poetlaureate, and W. J. Courthope, professor of poetry at Oxford. After 1893 Mr. Courthone remained sole editor until 1898, when he retired in favour of Mr. L. J. Maxse.

National Rifle Association was formed in 1860, its object being the encouragement of volunteer rifle corps and the promotion of rifle shooting throughout the King's dominions. nual meetings were held on Wimbledon Common from 1860 to 1889: after that a P. to 1889; after that on Bisley Common, near Woking. The fixture

now attracts not only volunteers from England, Scotland, Ireland, and Wales, but marksmen, either singly or in teams, from the Channel Islands, the colonies, and India.

National Service League, an association founded in 1902 for the purpose of securing general recognition of the necessity and advantage of universal military training throughout the British Isles, so that the country may be secured against attack by a strong citizen army, and, at the same time, the youths of England, now mostly town-dwellers, may have the advantage of the physical exercise in the open air inseparable from such training. The president is Field-Marshal Lord Roberts.

National Sporting Club was started towards the close of the 19th century for the purpose of promoting social intercourse amongst gentlemen interested in sporting, theatrical, and musical matters. The club premises are in King Street, Covent Garden, and here it is that many of the more important glove contests between professionals and amateurs take place.

National Telephone Com-

pany. See TELEPHONY.
Nativity, a name given to the season of Christmas, especially as a church festival. The nativity of the Virgin Mary is observed by the Roman Catholic Church on September 8, and was instituted c. 690 A.D.; that of John the Baptist (instituted c. 488 A.D.) falls on June 22. As used in astrology, nativity is equivalent to horoscope.

Natrolite, Na₂AlSi₃O₁₀2H₂O, a zeolite, white or pinkish, and usually transparent (sp. gr. 2'2, h. 51). It is one of the commonest secondary products after minerals of the nepheline group, and is found filling cavities in igneous rocks.

Natron or SODA LAKES, in the Libyan desert, Egypt, some 60 m. w. N. w. of Cairo; named after the sodium carbonate collected from

the waters.

Natural History originally included all the concrete sciences, and is now sometimes employed to include zoology, botany, and geology, as in the case of the Museum of Natural History.' Most frequently it is equivalent to zoology; but, on the other hand, not a few naturalists use it to include the study of the living organism in its relation to its environment as opposed to systematic zoology or comparative anatomv.

Naturalism. (1.) In theology it is the opposite of supernaturalism. All narratives which include a miraculous element are regarded by a naturalistic critic as more or less unhistorical; or, where events commonly regarded as miraculous are allowed to be historical, they are held by him to be susceptible of a naturalistic explanation. Naturalism in this sense is simply the refusal of historical science to admit any causes not known in the ordinary course of history. (2.) In philosophy, naturalism is opposed to idealism, and signifies the principle of explaining all experience in terms of natural and, as far as possible, physical science, or the system of thought that results from the application of this principle. Hence it comes to be practically identical with the milder versions of materialism which have figured in modern philosophy. See J. Ward's Naturalism and Agnosticism (1899), and Sorley's Ethics of Naturalism (1904).

Naturalization. See ALIEN. Natural Philosophy. See PHYSICS.

Natural Selection. See DAR-WINISM.

Natural Theology, the science which, apart from any special revelation, treats of the evidence for the existence of God; for men believed in God long before the Christian revelation, and beyond the confines of Judaism. Natural theology employed three great lines of proof: (1) the ontological argument, formulated by Anselm and restated by Descartes (hence often called the Cartesian)—viz. that as men possess the idea of an absolutely perfeet being, then, since existence is implied in perfection, there must exist such a perfect being, i.e. God; (2) the cosmological argument, or (Leibniz) argumentum a contingentia mundi-riz. that since something exists contingently or dependently, there must also exist something absolutely, i.e. God; (3) the physicotheological or teleological argument-viz. that as there is design in the world, there must exist a wise and intelligent cause of the same. Natural theology was represented in Britain by Paley, and in Germany by Wolff. The arguments were trenchantly dealt with by Kant, who in his Critique of Pure Reason showed their invalidity or insufficiency; while in Britain, Hamilton, Mansel, and Spencer have arrived at similar conclusions. On the other hand, there have been founded the Bridgewater Treatises, the Burnett Prize Essays, and the Gifford Lectures for the purpose of maintaining and confirming the conclusions of natural theology. See Flint's Theism (ed. 1889).

Nature, the recognized organ of the British scientific world, was founded in 1869. Its first and present editor is (Sir) Norman Lockyer. Among the early contributors were Darwin, Huxley, and Tyndall.

Nature Study, from the individual point of view, is 'the habit of observing and thinking for one's self, and at one's best, without books or helps, in presence of the facts, and in the open air' (Professor Patrick Geddes). This definition has to be supplemented by another—'A process by which simple natural objects and events acquire meaning' (Professor C. Lloyd Morgan). The movement which has brought nature study into prominence is a revolt against -(1) a tendency towards bookishness, and (2) a tendency towards premature specialization and undue detail in studying science. Not only does nature study deal with things at first hand, but it deals with them from the human standpoint. In nature study the practical, the esthetic, the moral, are quite as much regarded as the scientific aspect. The movement first came to clear consciousness in Froebel, whose vague idealism read meanings into the facts of nature that science does not endorse. The ultimate purpose of nature study is to make the pupil at home in his surroundings, to make the world in all its aspects intelligible to him.

The matters actually dealt with include the observation of living creatures and plants in their natural habitat, as well as the collecting and rearing of such specimens as lend themselves to this treatment. School gardens form a prominent feature in many countries. In France there are 28,000 of these gardens; and in Britain the custom of attaching a number of plots to elementary schools is rapidly growing. In Canada the plots are used as a sort of earthen blackboard, where specimens of different grains are grown, the children being per-mitted to pluck up one plant every day to observe its roots. The number of specimens of each plantis, of course, so arranged that, while one is pulled up each day, there will be enough left to allow of the last specimens being perfectly developed plants. A record of the changes is kept in a graphic form, for an essential part of nature study is the power to express what has been observed. Nature diaries' are written by the pupils collectively, each con-tributing his share. These diaries are often connected with what are known as 'seasonal studies,' in which the same objects-e.g. selected plants or animals—are observed persistently throughout all the seasons of the year. Weather records are very fre-

quently kept, even in the youngest

classes, the mode of record being

usually by symbolical drawings. The school excursion forms an important part in all genuine nature study. At the earlier stages the pupils observe anything and everything, and are allowed to ask questions about any matter that attracts their attention. As progress is made the excursions become systematized, and finally lead to what are somewhat ambitiously described as 'regional surveys' of the district within easy reach of the school. These surveys include the geology as well as the fauna and flora, and do not exclude even the antiquities and industries. An important feature at the final stage is the preparation of a map of the district. As the records kept in school pass from the form of pictorial representation to the abstract form of curves plotted out from the results supplied by daily observation, so the general description of the country in the regional survey ends in the ab-

stract map.

Nature Worship, or NATUR-ISM, is the worship of one or more of the powers of nature. general cult has manifested itself in a variety of forms. The anthropomorphic tendency which seems innate in the human mind in its dealings with the unknown has led to the frequent personification of the more obvious natural forces. Of these the most obvious is the sun, the author of light and heat, which has been personified and deified under many names. Nor is the sky god necessarily the sun, for the thunder and the rain have been separately defied as Jupiter To-nans and Jupiter Pluvius. The moon and the 'hosts of heaven' (a figure of speech which itself denotes personification) have also had their devotees. The worship of fire, allied to sun worship, represents the deification of another natural force. On the other hand, the intense cold of the north led the early Scandina-vians to include in their mythol-ogy the powerful 'frost giants.' Rivers, springs, trees, mountains, and animals have all been worshipped. And the reproductive energy in the animal and the vegetable world has been symbolized and reverenced in more ways than one. For fuller information, see MYTHOLOGY, SUN WORSHIP, SERPENT WORSHIP, TREE WORSHIP, and PHALLUS AND PHALLIC WORSHIP.

Naucratis, Greek settlement ancient Egypt, founded by Milesians about 640 B.C. It stood on the west or Canopic mouth of the Nile, not far from Sais. Thither all Greek traders resorted, for after the reign of Amasis (569 B.C.) they were allowed to do business nowhere else in Egypt.

Naugatuck, bor., New Haven co., Connecticut, U.S.A., 15 m. N.W. of New Haven. It manufactures rubber goods. Pop. (1900) 10.541

Nauheim, or BAD-NAUHEIM, wat.-pl. in grand-duchy of Hesse-Darmstadt, Germany, 24 m. by rail N.N.E. of Frankfort-on-Main.

Pop. (1900) 4,501.

Naumachia, in ancient Rome a spectacular sca-fight. These contests sometimes took place in the circus or amphitheatre, which was flooded for the purpose, but more often in special buildings. The combatants were usually captives or condemned criminals, who fought, as in gladiatorial contests, to the death, unless the vanquished obtained mercy from the emperor. The two sides were given the names of famous maritime nations, such as Tyrians and Egyptians, Athenians and Syracusans, or the like. Titus gave a naumachia in which 3,000 men were engaged.

3,000 men were engaged.

Naumburg, tn., Prussia, prov.
Saxony, on Saale, 30 m. by rail
w.s.w. of Leipzig; has a Romanesque-Gothic cathedral (carly
13th century), with pictures by
Lucas Cranach the Elder. Lepsius, the Egyptologist, was a native. Leather, woollen goods, and
combs are manufactured. Pop.

(1900) 23,192.

Naupactus, ancient Greek city on Corinthian Gulf, in territory of the Ozolian Locrians. It had a good harbour. The Messenians, expelled from their country in 459 n.c. by the Spartans, settled at Naupactus. Philip of Macedon captured it from the Acheans in 338 B.C. Its modern name is Lepanto.

Nauplia, fort. scapt., cap. of Argolis, Greece, on the Argolic Gulf, 25 m, by rail s, of Corinth. Mycenean remains have been found. It belonged to an ancient league of cities, which supported the worship of Poscidon at Calauria; it was only in later times that it became the port of Argos. In the middle ages it was a possession of the Venetians. From 1824 to 1834 it was the capital of Greece. In 1831 Capo d'Istria, the statesman, was assassinated here. Pop. (1889) 10,879.

Nauplius, the unsegmented larval form which occurs in all the lower Crustacea. See CRUSTACEA.

Nausea, the sensation of loathing which precedes vomiting, was originally applied to sea-sickness only. It may be produced by disagreeable impressions upon any of the senses. Some drugs cause nausea and vomiting, either by irritation of the stomach or of the vomiting nerve-centre in the brain. Nausea may be present in the early stages of pregnancy, and is often the first

symptom observed. It frequently precedes fainting. Treatment depends upon the cause. In many cases quiet in a recumbent position, with fresh air and a small stimulant—e.g. sal volatile or spirits—will suffice.

Natsicaa, in ancient Greek story, the daughter of Alcinous, king of the Pheacians. When Odysseus was wrecked on the coast of Pheacia, he found her playing ball on the shore, and from her learned how to approach her father. In her maidenly modesty, dignity, and simplicity, she is one of the noblest characters in all Greek literature.

Nautch Girls, native dancing girls in India. Dressed in skirts of scarlet and gold, with saris of bright hues, tight gilt trousers, and anklets of silver and gold bells, the girls dance for hours to the strains of amatory music, character pictures Leing introduced by the performers. Many of these nautch girls can read and write, and are the cleverest and most accomplished of their

Nautical Almanac, The, a volume of tables and calculations for the use of navigators and astronomers, first issued for 1767, and since published annually several years in advance. It was originally produced under the superintendence of the Royal Astronomical Society, but since 1834 has fallen under the care of the Admiralty. Similar foreign publications are the Connaissance des Temps (1679), the American Ephemeris (1855), and the Berliner Jahrbücher (1776).

Nautilus, a genus of cuttle-fish. Some three species now live in the Pacific Ocean, Indian Ocean, and other warm Eastern seas, but there are many fossil forms which date back to the Silurian period. The living species all possess four pairs of gills (Tetrabranchiata), and in this, as well as in the presence of an external chambered shell and many other structural peculiarities, they differ from the other living cuttles, which possess two pairs of gills only (Dibranchiata), never have an external chambered shell, and are more highly specialized in many respects than nautilus. Nautilus is thus a persistence through long ages, apparently unaltered, of an animal of primitive type, whose allies have become dominant and specialized. The best-known species is N. pompilius. It seems to live at the bottom in considerable depths, and feeds on small crabs and molluses, which are masticated by means of the strong jaws. The shell is spirally coiled, and consists of a series of chambers, in the last and largest of which the

animal lives, while the others contain gas only. Externally the shell is brownish in colour, marked by dark bands; but a beautiful pearly appearance (whence the popular name of pearly nautilus) may be got by dissolving the outer layers of the shell away by acid, so as to expose the inner layer, consisting of mother-of-pearl. In the young nautilus the shell is shaped like a little horn. As the animal grows larger it moves forward in the shell, which increases in size round the orifice, and forms a partition in its posterior region, which cuts off the apex of the shell, and is called a septum. These septa divide the shell into a number of chambers, which communicate with one another, and are connected to the body of the animal by a tube known as the siphuncle. In place of having the eight or ten suckerbearing arms so characteristic of other cuttles, nautilus has a large number of lobes round the mouth which carry little tentacles but



Nautilus.

no suckers. There is an incomplete siphon or funnel—that is to say, the two lobes forming the siphon are not completely fused together as in other cuttles, but only opposed to one another. There is no ink-bag, and the eye is simple and without a lens. Further, in the presence of two pairs of gills, two pairs of auricles in the heart, two pairs of nephridia, and so forth, nautilus is supposed to show some indications of an origin from a segmented ancestor. (See MOLUSCA.) The name paper nautilus is given to the argonaut, also called the paper sailor.

Navajoes, North American aborigines, next to the Apaches the most renowned and numerous branch of the South Athabascans. Those which survive are only in part gathered into the Navajo reservation, Arizona and New Mexico, and numbered altogether 23,000 in 1900.

Naval Architecture. See Shipbuilding.

Naval College, ROYAL See GREENWICH, ROYAL NAVAL COL-LEGE.

Naval Discipline Acts. The Naval Discipline Act, 1866 (22) and 30 Vict, c. 109), as amended by the Act of 1884 (47 and 48 Vict, c. 39), defines the offences punishable under naval law, prescribes the punishments, and regulates the constitution, procedure, and jurisdiction of naval courts-martial. See COURT-MARTIAL.

Naval Education. At the age of twelve a boy intended for a commission in the navy, on receiving a nomination, being of sound health and otherwise suitable, undergoes a qualifying examination. Having passed this satisfactorily, the candidate is a naval cadet, and goes to the Royal Naval College at Osborne for two years, and then to Dartmouth College for another two years. He then becomes a midshipman, and passes the next three years at sea. After examination he is promoted to the rank of acting sub-lieutenant, and spends about a year ashore studying at Greenwich and Portsmouth. On qualifying by examination again, he becomes a sub-lieutenant, and is drafted into one of the three branches of the service - the executive, the

engineers, or the marines. Naval Expenditure. well devoted a larger proportion of the national income to this object than any ruler before or since. At the time of the revolution the naval expenditure was £1,087,205 for the two and a half years ending Oct. 12, 1688. In 1756, when the Seven Years' war began, the number of men was 52,809, and the expenditure £3,349,021. By the time the war was over the expenditure had increased to £5,128,977. After peace had been restored, in 1764, the expenditure dropped to £2,094,800, and the number of men to 20,603. From 1773, when the war with the American colonies broke out. for ten years -during the last six of which there was also trouble with France, Spain, and Holland—the expenditure rose with the dangers which Great Britain was called upon to face. following table will show how matters then stood :-

With quieter times, in 1784 the numbers were 28,878, and the expenditure was £3,153,869; and for the next seven years the expenditure only twice exceeded three millions. With the year 1793 began almost uninterrupted

warfare for twenty-three years. The following table for this period will speak for itself:

Year.	Men.	Money.
1793	. 59,042	£3,971,915
1797	. 120,016	13,033,673
		10,211,379
		19,578,467
1814	. 126,414	23,504,070

For the next quarter of a century after 1816 the expenditure ranged between seven and a half millions and five millions.

With the outbreak of war with Russia the expenditure more than doubled.

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Year. Men. Money.
1853 - 4... 45,885... £7,197,804
1855 - 6... 67,791... 19,590,833
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After the war with Russia the expenditure fell below ten millions, and for the next twenty years remained about the same. The number of men during that period was usually between 60,000 and 70,000.

With the year 1881 statesmen began to give more systematic attention to naval expenditure. The Franco-German war and the Russo-Turkish war had accentuated the importance of keeping pace with continental navies. The tendency is represented by the following table:—

Year.	Men.	Money.
1881-2.	. 58,800.	. £10,870,922
1885-6.	. 56,950 .	16,193,701
1890-1.	. 63,598.	17,165,083
1895-6.	. 79,862.	19,637,238
1899-190	0110,640.	26,594,500
		34,457,000
1904 5.	. 131,100 .	36,889,500
		33,389,500

Naval Literature may for convenience be classified as follows: (1) History and antiquities; (2) biography; (3) diaries, journals, logs, and recollections of a personal character; (4) pamphlets; (5) poetry and fiction; (6) miscellaneous publications, especially those dealing with naval administration and social life in t'e

(1.) Of histories that are wholly naval, some deal with (a) the navy from the historic standpoint, and others (b) with history from the naval standpoint. To the former class belong Sir N. H. Nicolas's History of the Royal Navy (1847), which brings the story down to 1422; John Campbell's Lives of the British Admirals, continued by Berkenhout, H. R. Yorke, and W. Stevenson (8 vols. 1812-17); W. James's Naval History of Great Britain from 1793 to 1820, continued by Chamier to 1827 (6 vols. 1837); E. P. Brenton's Naval History of Great Britain, 1783-1832 (5 vols. 1823); Isaac

Schomberg's Naval Chronology, to 1802 (5 vols. 1802); Thomas Lediard's Naval History of England (2 vols. 1735); Josiah Bur-chett's Complete History of the most Remarkable Transactions at Sea (1720); Laird Clowes's The Royal Navy (7 vols. 1897-1903). the only large work covering the whole period of British naval history; and E. Chevalier's Histoire de la Marine Française (4 vols. 1877-99); J. C. de Jonghe's Nederlandsche Zeewesen (6 vols. 1833-48); A. Vecchi's Storia Generale della Marina Militure (2 vols. 1892); Loir's La Marine Française (1893); Tesdorpf's Geschichte der (1889); Scharf's History of the Confederate States Navy (1894); Chabaud-Arnault's Histoire des Flottes Militaires (1889); H. W. Wilson's Ironclads in Action (2 vols. 1896); E. S. Maclay's History of the United States Navy (3 vols. 1898 1901); T. Roosevelt's Naval War of 1812 (4th ed. 1889); and D. D. Porter's Naval History of the Civil War (1887). Shorter and more popular works are H. Williams's Britain's Naval are H. Williams's Britain's Navat Power (1894), and E. Wilmot's Our Navy for a Thousand Years (1904). Among works (b) dealing with history from the naval standpoint the chief are A. T. Mahan's Influence of Sea Power upon History (1890), Influence of Sea Power upon the French Revolution and Empire (2 vols. 1892), and Sea Power in its Relation to the War of 1812 (2 vols. 1905); P. H. Colomb's Naval War-fare (1899); J. K. Laughton's Studies in Naval History (1887); and Froude's English Scamen in the Sixteenth Century (1893).

(2.) Of naval biographies some of the most important are A. T. Mahan's Nelson (1899); Southey's Nelson (1813; new ed. 1904); Laughton's Nelson (1895); Beresford's and Wilson's Nelson (1890); J. Corbett's Drake (1890) and Monk (1889); Fortescue's Dundonald (1895); D. Hannay's Blake (1886) and Rodney (1891); Barrow's Anson (1839), Drake (1861), Howe (1838), and Sidney Smith (1848); Edwards's Raleigh (1868); G. Penn's Penn (1833); E. P. Brenton's St. Vincent (1838) and Brenton (1846); Jones's Frobisher (1878); Brighton's Broke (1866); Bourchier's Codrington (1873); Collingwood's Collingwood (1891); Deane's Deane (1870); H. Dixon's Blake (1852); Dundonald's Autobiography of a Seaman (1890); Corbett's Drake and the Tudor Nany (1898); Murray's Durham (1846); Burrows's Hawke (ed. 1904); Osler's Exmouth (1841); Chatterton's Gambier (1861);

Headley's Farragut (1867); Mahan's Farragut (1892); Memoirs of Paul Jones (1830); Keppel's Keppel (1841); Mundy's Rodney (1830); Napier's Napier (1862); Hunt's Palliser (1844); Phillimore's Parker (1870); Parry's Parry (1860); Pettigrew's Nelson (1849); Brighton's Provo Wallis (1892); Ross's Saumarez (1838); Smyth's Philip Beaver (1829); C. R. Markham's Robert Fairfax (1885) and John Davis (1889); A. Markham's Franklin (1891); A. Markham's Franklin (1891); Sharp's Symonds (1858); Tucker's St. Vincent (1844); Grinnell-Milne's De Ruijter (1896); Allardyce's Keith (1882); Armstrong's A Tar of the Last War—being Sir Charles Richardson—(1855); Semmes's My Adventures Afloat (1869); Sir H. Keppel's A Sailor's Life under Four Sovereigns (1899); Sulivan's Sulivan (1896); Otway's Lord C. Paget (1896); Egerton's Hornby (1896); and Fitzgerald's Tryon (1897). Among biographical collections are O'Byrne's Naval Biography (1823–37); Ralfe's Naval Biography (1828); Under See-Helden (1681), from the Dutch by Krämer; and Charnock's Biographia Navalsis (6) vols 1794–8).

sesses greater interest or value than Samuel Pepys's Diary from January 1660 to May 1669. Valuable as intimate records are Henry Teonge's Diary, from 1675 to 1679 (1825); T. Pocock's Memoirs relating to Lord Torrington, from 1683 to 1705 (1889); Taubman's Diary of a Chaplain (1710); Memoirs of De Forbin (Eng. ed. 1734); Dampier's Voyages (ed. 1779); Cook's Voyages (ed. by Wharton, 1893); Sloane-Stanley's Reminiscences of a Midshipman's Life from 1850-1856 (1893); H. Robinson's Sea-drift (1858); Woodes Rogers's A Cruising Voyage round the World (1718); Narborough's Voyage to the South Sea (1669); Osborn's Stray Leaves from an Arctic Journal (1852); Thirty-six Years of a Scafaring Life, by 'an Old Quartermaster' (1839); J. Scott's Recollections of a Navat Life (1834); At School and at Sea, by 'Martello Tower' (1899); J. H. Boteler's Recollegtions of my Sea Life (1883); J. Byron's Journal of a Voyage round the World (1767); Mon-son's Naval Tracts (1902); Dorville's Cruising in Many Waters (1883); A. C. Evans's Cruise of H.M.S. Calliope (1891); Basil Hall's Fragments of Voyages and Travels (1831-40); M'Leod's Voyage of H.M.S. Alceste (1818); Menzies's The Captain's Yarns (1886); Hobart Pasha's Sketches from my Life (1886); Service Afloat (1833); Spry's Cruise of

the Challenger (1876); Darwin's Journal of H.M.S. Beagle in 1831-6 (ed. 1890) and Voyage of the Beagle (1852). (4.) Few pamphlets possess a

(4.) Few pamphlets possess a distinctively literary character.

(5.) The masters of English naval fiction are T. Smollett, in Roderick Random (1748); Michael Scott, in Tom Crinyle's Loy (1836) and The Cruise of the Midge (1836); J. Fenimore Cooper, in Pilot (1823), Red Rover (1826), The Two Admirals (1842); F. Marryat, in Frank Mildmay (1829), Peter Simple (1834), and Mr. Midshiyman Easy (1836); James Hannay, in Singleton Fontenoy (1850); F. Chamier, in Ben Brace (1835) and Life of a Sailor (1832); J. Moore, in The Post Captain (1808); and 'Q,' in The Blue Pavilions (1903). R. H. Dana, jun., in Two Years Refore the Mast (1840), and George Cupples in The Green Hand (1900), as well as W. Clark Russell, have written admirable sea stories which are not distinctively naval. And here may also be mentioned The Cruise of the Cachalot (1898) and other books by F. T. Bullen.

Naval poetry is for the most part brief, chiefly in the form of songs, though W. Falconer's Shipwreck (1762) and Newbolt's Admirals All (1896) are exceptions. Of naval song-writers the most notable are Charles Dibdin and

Thomas Campbell.

(6.) Miscellaneous naval literature includes Glascock's Naval Sketch Book (1826), Robinson's The British Flect (1898), Thompson's Sailors' Letters (1767), and the scandalous British Navy in the Present Year of Grace (1885). To this class also belong such works, written partly as fiction and partly as propagandist pamphlets, as The Great Naval War of 1887. The Battle of Port Said, The Adventures of a Whitehead Torpedo, Laird Clowes's Captain of the Mary Rose (1892), and Jane's Blake of the Rattlesnake

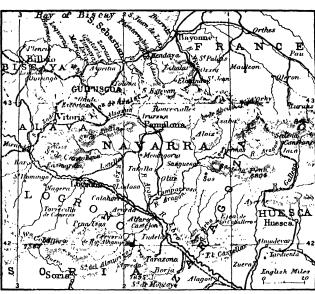
Naval Manœuvres, an annual system of practice in time of peace, carried out by the navies of all the great powers, but specially by the British navy. Manœuvres are intended primarily for exercise, instruction, and experiment, and do not altogether represent the conditions of actual warfare, but are nevertheless of great value. They consist of sham battles, such as naval attacks on Portsmouth, Liverpool, and other ports, searching for the enemy's fleet at sea and attacking it, etc. The manœuvres usually take place in St. George's Channel, the Irish Sea, or in the open Atlantic: in 1903 a battle took place off the Azores. In the manœuvres of 1906 the co-opera-

tion of the mercantile marine was obtained. The plan of operations assumed a state of war between a stronger naval power (red) and a weaker but still formidable naval power (blue), whose object was to raid and destroy the commerce of 'red.' The result of the manœuvres seemed to show that in a state of real war 'blue' would have caused very serious injury to maritime commerce. In 1899 wireless telegraphy for the first time played a part in this mimic warfare.

Naval Reserve, ROYAL, is composed of officers and men of the mercantile marine. The service, which was established in 1862, is voluntary, and the officers and men are given an annual retaining fee. The number of officers

of the ancient town are farther to the north. Ibrahim Pasha captured the town in 1825. In the bay, on Oct. 20, 1827, the British, French, and Russian fleets destroyed the Turkish and Egyptian fleets, and thus secured the independence of Greece. Pop. 3,000.

Navarre (Sp. Navarra), ancient kingdom of the Iberian peninsula. The territory, with the exception of one province, lay on the southern slope of the Pyrenees, extending down to the Ebro. The province on the N. afterwards became Basse-Navarre. The Spanish division is still kept distinct for administrative purposes, and measures 80 m. from N. to S., and 60 m. from E. to W., with Pamplona as its capital. Agriculture flourishes, timber and



Navarre.

(1905) is 1,844. The period of drill for general training and gunnery instruction is twenty-eight days every year, reduced to seven days only when the officer is efficient. The royal naval reserve may be called out for service in the case of national emergency. Reserve officers are allowed to apply for twelve months' training with the fleet, and are afterwards eligible for employment in the navy in lieu of lieutenants on the established list.

Navan, tn., Co. Meath, Ireland, at junction of Blackwater and Boyne, 7 m. N.N.E. of Trim. It has a woollen and a bacon factory. Pop. (1901) 3,839.

Navarino, or Pylos, seapt., Messenia, S.W. Greece. The ruins cattle are raised, and textile and fictile industries utilize the abundant water power. Cereals, wine, fruit, and oil are produced. Area, 4,055 sq. m. Pop. (1900) 307,669. The first known ruler of Navarre was a Christian chief named Sancho Iñiguez in 905, whose grandson, Sancho III., the Great (970-1035), became the most powerful Christian monarch in Spain, being also, in right of his wife, ruler of Castile. In 1191 Sancho VI. endeavoured to secure his position by marrying his daughter Berengaria to Richard I. of England, and on the death of his son, Sancho VII. (1234), the male line of Iñiguez ended. The Navarrese Cortes chose (1234) as their sovereign Thibault,

Count of Champagne, a French nephew of Sancho VII. By the marriage of Jeanne Thibault, heiress of Navarre, to Philip the Fair, King of France (1284), the kingdom was merged into that of France. On the death of her son, Charles IV., without male issue (1328), Navarre passed to her daughter, Jeanne II., who married Count d'Evereux, and was succeeded by her eldest son, succeeded by her eldest son, Charles the Bad, the ally of Edward the Black Prince against Peter the Cruel of Castile. The granddaughter of Charles the Bad, Queen Blanche, married John II., who succeeded in 1458 to the kingdom of Aragon, on the death of his brother. Alfonso v. Their son, the Prince of Viana, heir to Aragon and Navarre, was done to death (1461) by his father, in the interest of the children by his second marriage with Joan Henriquez, amongst whom was Ferdinand V. afterwards king of Aragon, and consort of Isabel the Catholic of Castile. The next heiress, Blanche, sister of the Prince of Viana, was also poisoned (1464), and the youngest sister, Eleanor, wife of Gaston de Foix, became queen of Navarre in 1469. In 1512 Ferdinand v. of Aragon (the Catholic) annexed Navarre to the crown of Castile, expelling the queen, Catherine de Foix, and her husband, Jean d'Albret. From the marriage of their granddaughter Jeanne d'Albret with Antoine de Bourbon, Henry IV., titular king of Navarre, was born; and on the extinction of the sovereign house of Valois, by the murder of Henry III. (1589), Henry IV. succeeded throne of France. French Navarre was then merged into France. while Spanish Navarre became part of Spain.

Navarrete, Martin Fernan-Dez De (1765-1844), Spanish scholar, born at Abalos (Rioja prov.); discovered in the Spanish archives at Simancas vast stores of new material for history, especially in connection with the discovery of America, and from 1814 till his death edited them. They are still being published, under the title of Documentos Incations. Navarrete also wrote a good Life of Cervantes (1879). See Mendoza y Navarrete (1845).

Navarro, MME. See ANDERSON, MARY.

Nave, in architecture, the central part of a church, so called from a supposed resemblance to a ship. It was formerly the custom, as now in many Roman Catholic churches, to separate the chancel from the nave by a screen. Durham Cathedral presents an example, rare in England, of a high altar placed in the nave.

Navies. The beginnings of the British navy date back to the time of Alfred the Great, who built a fleet of galleys to repel the Danish invaders. Fleets were collected for various purposes by the early Norman kings, and in 1340 that of Edward III. defeated the French in the battle of Sluys, and the Spanish off Winchelsea ten years later. The Royal ten years later. The Royal Harry built by Henry VII., and the establishing of Trinity House and the Navy Office by Henry VIII., may be said to mark the starting point of the present royal navy. At the death of Henry VIII, the navy consisted of over fifty ships, with a tonnage of 12,000, which had increased at the close of Elizabeth's reign to over 17,000 tons. Under the Stuarts the tonnage of the navy rose to over 100,000, carrying 7,000 guns and 42,000 seamen. At the death of Queen Anne the tonnage amounted to 167,000, which under George II. increased to over 320,000, and under George III. to over half a mil-lion tons. Under Queen Victoria revolutionary changes took place in the British navy. Steam began to assert itself, and iron to take the place of wood in the building of ships; while the past few years have seen the advent of yet another type of naval engine of destruction in the submersible and the submarine.

DEVELOPMENT OF MODERN NAVIES. -Although the application of armour to the sides of ships did not become a general practice prior to the advent of shells, and the resultant danger to wooden-sided vessels, nevertheless it is possible to trace the desire for some superior sort of protection far back in history. The famous galley of Trajan (see History of Navigation, attributed to John Locke) was covered externally with leaden sheets affixed with copper nails; whilst in 1673 an order was issued from the Admiralty directing that certain ships of the navy should be sheathed with lead. This was the commencement of sheathing as we know it to-day: it was more for protection against the ravages of sea-water than of an enemy.

In 1354 Peter of Aragon, struck by the damage occasioned in naval combats by fire, ordered a complete sheathing of leather to be given to some of his ships. The idea was not followed up, however, until 1530, when the famous carrack Santa-Annu, a present from the Chevaliers of St. John of Jerusalem to Charles v. for his expedition against Tunis, was said to have been cased in lead. At the battle of Lepanto, in 1571, the Catholic ships were protected by fitting upright beams inside the decks,

leaving a space between them and the hull to be filled in with old sails, ropes, and other material. In 1782, Chevalier d'Arcon designed and had built ten floating batteries protected on one side only with a turtle-back cover six feet thick, and composed of wooden beams reinforced by leather and cork, and bound to-gether by iron bars. Water was to be kept constantly flowing between the various layers of the turtle-back as a protection against fire. On September 13, 1782, Admiral Moreno ranged these ten additions to his force before Gibraltar, and opened fire with their 212 guns. The English replied with red-hot shot, and in spite of the water device five of them blew up and the others ran ashore, burning furiously, only 487 of their crews of 5,260 being saved. In 1814 Fulton came upon the scene with the Demologos, the first steam war-vessel to be set afloat. The Demologos had a length of 156 ft. and was propelled by a single paddlewheel working between a doublehull. She blew up as the result of an accident in 1829. From that date the attempts to evolve a successful armoured war-vessel are too numerous to recount. In the action off Sinope (November 30, 1854) the value of shells was first demonstrated. Here, in less than half an hour, six Russian ships, under Admiral Nakhimoff, annihilated a Turkish force of seven frigates, two corvettes, and two steamers. This vettes, and two steamers. action definitely decided all nations to adopt armour protection for their ships. France and Great Britain, the two chief naval powers, took the lead; but whilst in France wooden ships already built were cut down and partialige armoured, Great Britain com-menced at once the construction of iron-hulled armour-clads, and also added protection to many wooden vessels then in commission. France still remained true to wooden hulls, and built her ironclads of this material until the early seventies of last century. The French Gloire, historical as the first sea-going ironclad, was launched on November 24, 1859. She was designed by Dupuy de Lôme, displaced 5,618 tons, and steamed 12.85 knots on trial. The Warrior, Great Britain's first ship, was designed by Watts, launched on December 29, 1860, displaced 9,210 tons, and steamed 14.35 knots. Both vessels were plated with 44 inches of iron. At this time began the contest between guns and armour. No sconer were protected ships afloat than guns were built capable of piercing that protection. The result was that armour grew thicker and immensely heavier,

and guns became larger. This led to two modifications in the original design. The first ships had been of the continuous belt and broadside battery type, with a large expanse of side covered with a thin iron sheet, and pierced for a large number of cannon. Soon the armoured surface grew less, and did little more than protect the guns, which, owing to increased weight and size, had perforce to be reduced in number. All these early ironclads were fully rigged, and depended for propulsion as much upon their sails as on their engines. In 1860 Captain Coles brought forward his first design for a turret-ship, antedating Ericsson's *Monitor* by over a year. In 1862, Sir E. J. Reed was appointed chief constructor, and introduced recessed ports, first in the Pallas, and then in an improved form in the Hercules, and later designed the Audacious class, a successful series of central-battery ships, giving for the first time in history a good all-round fire in a high free-board ship; and in the fultan the upper deck battery, further improving the axial fire. About this time France was mounting two or more large guns in barbettes, placed first on either beam and eventually lozenge-wise - i.e. one at either end and one on each beam, thus allowing three guns to fire ahead, astern, or on the broadside. In England we took up the barbette tentatively in the Temeraire, mounting fore and aft two 25-ton guns on disappearing carriages. In this ship and in the Alexandra we reached finality as regards broadside and central-battery vessels, the turret ship then taking its place. In 1862 the Royal Sovereign, a wooden three-decker, had been cut down and converted into a four-turreted ship. She was followed by the Prince Albert, built of iron; but both lacked sail power, considered essential in those days, and were consequently relegated to coast defence. The Monarch was ordered fence. in 1865, the first really sea-going turret-ship to be designed, and simultaneously Messrs. Laird laid down the rival Captain from plans by Captain Coles, which in September 1870, under the command of Captain Burgoyne, turned turtle' in the Bay of Biscay. At this time three sea-going mastless turret-ships of the Devustation type were in hand, and these proved highly successful. They carried, on a displacement of 9,300 tons, two circular turrets of 10 to 14 in. armour, each containing a pair of 35-ton guns. Between the turrets was a light superstructure with a flying deck, on which were mounted lighter weapons, these being the begin-ning of the present day 'secondary

armament.' Rams were also fitted to ships of all classes, and only now are they being abandoned. The advent of the torpedo necessitated a vessel for its special use, and fast screw launches were introduced by Messrs. Thornycroft and Yarrow, from which have developed the torpedo boats and destroyers of to-day. The nations of Europe were not behindhand in adopting the turret-ship, and whilst Russia acquired the Petr Veliki and the United States embarked on a series of low-freeboard monitors (or coast-defence battleships), Italy commenced the construction of the at that time monstrous Dandolo, displacing nearly 11,500 tons, and mounting in two turrets placed diagonally athwartships four huge 60-ton Armstrong guns of great power. Her protec-tion was in the nature of an armoured box or citadel made of 214 inches of iron. The belt beyond the citadel was abandoned, its place being taken by an armoured

sitated by the rapid evolution of Muzzle-loading torpedo craft. guns were finally banished, though they did not disappear from the fleet until quite recent years. The cruiser, both armoured and protected, was evolved separately and distinctly from the line of battleships, being given greater speed at the expense of protection and armament. Masts and sails were discarded, steel armoured masts or mere signalling masts taking their place; quick-firing guns came speedily to the front, and increased in efficiency, both as regards power and trustworthiness. More important still was the determination of our administrators to build our ships in homogeneous groups. A policy of drift as regards new construction had left us in the early 'eighties in a dangerous position at sea, and between 1889-94 we laid down and completed over seventy vessels of various types ordered under what is known as the Naval Defence Act. From that time onwards third, and the rest nowhere, Spain, Italy, Holland, and now Russia, haveall been outdistanced even by Japan, a nation destined to contest the supremacy of the sea at some future date. The battleship of the future will have to undergo a still further change, if we are to be guided by the lessons of the Russo-Japanese war. The standard battleship of today has been of between 12,000 and 15,000 tons displacement, belted with steel of from 9 to 12 inches in thickness, endowed with a trial speed of at least 18 knots, and carrying four guns paired in shielded barbettes, from ten to eighteen weapons of smaller calibre as a secondary armament, and about two score of small quickfirers as a defence against torpedo craft. Modern conditions, however, demanded an increase in the secondary armament, and in the eight vessels of the King Edward VII. class there are, in addition to the usual 12-in, B.L. and 6-in. Q.F. guns, four of 9'2-in. mounted

Comparison of British and Foreign Navies (built and building) at April 20, 1906.

(From 'The Naval Pocket-Book.')

	Great Britain,	France.	Germany.	Italy.	Austria- Hungary.	Russia.	Japan.	United States.
Battleships 1st Class Battleships—2nd Class Battleships—3rd Class Armoured Cruisers. Protected Cruisers—1st Class Protected Cruisers—2nd Class Protected Cruisers—3rd Class Cruiser Scouts Torpedo Gunboats Torpedo Boat Destroyers Torpedo Boats Submarines	42 13 9 43 21 47 23 8 27 155 102 30	11 10 15 25 4 15 17 	15 9 13 8 6 3 28 5 61 45	6 5 4 11 2 6 12 14 25 172 8	6 10 3 - 2 8 - 11 6 89	8 4 6 10 11 3 5 1 8 83 165 26	13 4 14 14 12 12 4 4 50 13	21 4 1 15 2 11 9 3 - 20 32 22

deck 2 inches thick and situated below the water-line. Great Britain followed with the Inflexible, and, increasing the displacement to 11,880, made the armoured citadel 24 inches thick and added an inch to the protective deck. The introduction of compound armour' and steel in the place of iron permitted of a reduction in the great thickness of the side armour then in vogue, and the turret presently found a serious rival in the armoured barbette, a type of gun-platform first adopted in France. The advent of Sir William White to the Admiralty saw the initiation of many shipbuilding reforms, and in the Admiral class we may trace the beginning of our modern navy. Here, on a displacement of about 10,000 tons, we obtained a battery of four heavy breechloading guns mounted en barbette fore and aft; and between them, in an unarmoured battery, a definite secondary armament, neces-

we have had regular annual programmes based on our necessities as judged by foreign shipbuilding. Displacements began to rise, and with them speeds, and for battleships nothing less than 171 knots was accepted, with three knots more in cruisers. In 1890 Germany came forward to join the race for sea-power, France and Russia at that time holding the second and third places. The Chino-Japanese war in 1894 drew attention to a further competitor, our allies the Japanese; and in 1898 America, by destroying the Spanish fleet, and thus proving the value of sea-power, placed herself under the necessity of com-peting as well. On all sides the development of a definite 'type' was attempted, and owing to the ever increasing size, and hence cost, of battleships, the wealthier powers came quickly to the front, until we find Germany and America running neck and neck for second place, France a meagre singly in barbettes at the corners of the citadel. In the Lord Netson class, of 16,500 tons displacement, the 6-in. Q.F. disappears, the secondary armament consisting of ten 92-in. B.L., in addition to the ordinary anti-torpedo boat weapons. In the Dreadnought, the latest word in naval construction, the speed has been raised to 21 knots, mainly owing to the introduction of steam-turbines. This remarkable vessel has a displacement of about 19,000 tons, and carries little between the 12-in. B.L. and the small quick-The evolution has been firers. quite as strange and more rapid as regards cruisers. The protected type has been practically abandoned, all the energy of naval constructors being concentrated on the development of the armoured cruiser. These, from a displacement of 4,000 to 6,000 tons, now vie with battleships in displacement; and the speed called for in our newest type,

the Invincibles, is no less than 25 knots. Here also the 6-in. gun has disappeared, an intermediate weapon of 75-in. bore Here also the 6-in. having been produced, though probably only to be superseded by the 92-in. B.L.—a gun combining immense power with great handiness. A displacement of 18,000 to 20,000 tons seems now to have been generally accepted by all nations rich enough to enter the lists, and for armoured cruisers 15,000 to 17,000 tons alone suffices. Recent years have seen great progress in submarine navigation, and most navies possess a flotilla of submersible boats; whilst a new type, called 'scouts,' has been evolved—small, unprotected, weakly-armed cruisers of great speed. Destroyers, which formerly were of 250 tons displacement and 26 knots speed, now touch 1,000 tons in our latest sea-going type, and must maintain a velocity of 36 knots. At the present time Great Britain has a good lead in every class of ship over any other nation or combination of nations, but America and Germany are making a bold bid to outdistance her.

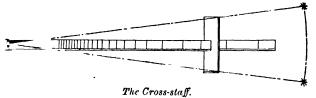
The preceding table gives the classification and relative strengths of the chief naval powers. It includes the vessels under construction at April 1906. See also Jane's All the World's Fighting Ships Illustrated (pub-

lished annually).

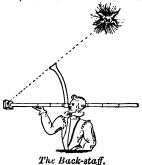
Navigation, the science of finding the position of a ship at sea, and of conducting her from one point to another. The Phœnicians, Syrians, Carthaginians, Greeks, and Romans, conducted their voyages solely by observation of the heavens, and by keeping as much as possible to the coast; and it was not until the voyages made by direction of Prince Henry of Portugal, after 1418, that navigation seems to have been systematically conducted, and the instruments and sea-charts then constructed form the basis of the mari-time science of the present day. An early invention that marked progress was the crossstaff, first described by Werner in 1514. It was used for the determination of longitude, by observation of the distance between the moon and some star; and out of it grew the fore-staff and the back-staff. In 1530 Gemma Frisius of Louvain devised the idea of using small clocks in conjunction with instrumental observation, and the nautical quadrant in some form was thenceforth part of every ship's furniture. John Davis's quadrant (the backstaff) seems to have been generally preferred for many years. In the early 16th century there also came into use at sea the

astrolabe, for taking the altitude of the sun and stars. This instrument was made very heavy, so that it hung perpendicularly and steadily. The middle of the 16th century saw the invention of the log-line. Voyages were, however, conducted rather by guesswork and experience, and especially so previous to the discovery of methods of finding the longitude. Mercator's system of plane charts furthered progress; and Edward Wright, a fellow of Caius College, Cambridge, discovered the true method of dividing the mer-

comprised a number of astronomical matters, a calendar, a method of determining the age of the moon and the tides, a description of the sea-compass and its variations, a table of the sun's declination for four years, the measurements of time and how to determine them, and finally an explanation of the errors in the old sea-charts. Among English writers, the earliest of note was Dr. William Cunningham, who brought out Cosmography and Navigation in 1559, and demonstrated the use of the quadrant.



idian, and drew up a table for the use of navigators, by which latitude could be determined. He also devised a system of what were called sea-rings, from which compass variation, altitude of the sun, and time of day could be determined in any place where the latitude was known. About 1614 arithmetical as opposed to instrumental calculation was introduced, and about 1620 trigonometry and logarithmic tables were applied to the science of navigation. The latter improvement was due to Edmund Gunter. who also introduced an instrument, called the crossbow, for de-



termining the altitude of the sun and stars.

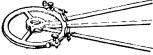
Among the most famous early works on navigation are those of Pedro Nunez, a Portuguese mathematician, who wrote De Arte et Ratione Navigandi ahout 1567. In 1563 Pedro de Medina published at Valladolid a work on navigation, which, with another published in 1556 by Martin Cortes, became an accepted authority among seafaring nations. Cortes's work

In 1577 William Bourne brought out a supplement to Cortes's Spanish work. In 1581 Robert Norman issued a treatise on the dipping needle—a discovery which he had previously made. William Borough, who afterwards became Queen Elizabeth's comptroller of the navy, published a work in 1599 on compass variation. Mention has already been made of John Davis and Mercator. In 1754, J. Robertson, published Elcments of Navigation, which was long a standard work. In 1761, Dr. Nevil Maskelyne, astronomerroyal, devised a method of finding the longitude at sea by lunar observation. In 1763 he published his British Mariner's Guide, which was far in advance of any thing else of the period. At the same time a nautical ephemeris of lunar observation was drawn up under the auspices of the then Board of Longitude. Out of this grew the Nautical Almanac, which was first issued in 1767. In France, George Fournier published his Hydrographie in 1633. A more elaborate work by Pierre Bouguer, jun., founded on an earlier work by P. J. Bouguer, was published in 1753, and called Nouveau Traité de Navigation. It describes a variation compass which is said to be the invention of the author. In 1738, however, in the Philosophical Transactions of that year, Captain Middleton had described a similar one; and improvements had been made by John Smeaton by the year 1750. Another famous work, published by Blondel St. Aubin (1673), was the Trésor de la Navigation. It included a description of an instrument for making calculations at sea, which was a sort of skele-ton of Wright's Universal Map. Ten years later, Dassier, in his

Pilote Expert, showed French navigators the use of Gunter's scales; and in 1693 a work called Le Neptune Français, consisting of sea-charts on Wright's principle, was brought out. further GREAT CIRCLE SAILING and COMPASS. In addition to works already mentioned, see Bowditch's Practical Navigator of Navigation (1803; 21st ed. 1878); Forman's Epitome of Navigation (1803; 21st ed. 1878); Forman's Epitome of Navigation gation (1821; many eds.); Raper's Practice of Navigation (1840; many eds.); Evers's Navigation and Great Circle Sailing (1868); Jeans's Navigation and Nautical Astronomy (1858; many eds.); Rosser's Nautical, Logarithmic, and Astronomical Tables (1878); Ledieu's Nouvelles Méthodes de Navigation (1877); Martin's Treatise on Navigation and Nautical Astronomy (1888); Littlehales's Dcvelopment of Great Circle Sailing (1889): Lecky's Wrinkles in Practical Navigation (14th ed. 1903).

Navigation, PRACTICAL. COASTAL NAVIGATION. - When sailing along a coast, a ship's position is found by reference to points of land, lighthouses, beacons, or any prominent marks indicated on the chart. If only one point is available, an approximate position may be found by taking a bearing-i.e. noting the direction by compass in which the point lies from the ship -and estimating the distance from it. A more exact position is found as follows:—A bearing of the point is taken, and the ship kept on her course for some distance, and then another bearing is taken. These bearings are then drawn on the chart, a parallel rule is placed across them in the direction of the ship's course, and moved to or from the point until the distance between the lines on the chart is found to coincide with that sailed by the ship in the interval. All bearings taken from the compass must be converted into magnetic bearings, by allowing for the deviation, before drawing them on a magnetic chart. If the chart is a 'true' one, the variation must also be allowed for: the amount of variation is marked on the chart. A particular case of the foregoing, known as the 'four-point bearing,' is used for finding the distance off a point when it is abeam -i.e. when its bearing is at right angles to the direction of the ship's head. A bearing of the point is taken when it is four points (45°) on the bow, and again when it is abeam: the distance sailed in the interval is the distance from the point when abeam. The distance sailed is found from the log. See Log. When two points are in sight, compass bearings of them are taken simultaneously, and, after

being corrected, are drawn on the chart: their point of intersection is the position. If three suitable points are in sight, the position may be found by measuring the angles between them. An instrument, called the 'station pointer,' is then brought into use.



Station Pointer.

It consists of a circle with three arms radiating from its centre, and these arms are set at angles with each other corresponding to the angles between the objects. By plucing it on the chart so that each arm passes across one of the observed points, the centre of the circle fixes the position of the ship. In foggy weather, when it is not possible to take bearings of points, the navigator has to feel his way along with the lead or sounding machine. The position found in this way is only a rough approximation, and it is necessary to get a series of soundings in order to utilize them to the best advantage.

OCEAN NAVIGATION.-Away from land a ship's reckoning is carried on by two methods con-currently—viz. by dead reckoning (D.R.), and by observations of ec-lestial bodies. The D.R. is valu-able when, as in thick weather, observations of the sun or stars are not possible for several days. For position by D.R. the navigator relies on his compass and log, and refers to the chart for the courses steered are entered in the log-book, together with the distance run on each course. These courses are corrected for variation, deviation, and leeway (if any), the result being true' courses. All books of nautical tables contain a traverse table, which gives the number of miles made good to the N. or S. (called difference of latitude), and also the number of miles made good to the E. or W. (called departure), corresponding to any course and distance. The true courses are entered in a traverse form, the corresponding 'D. lat.' and 'Dep.' being taken from the traverse table and entered in separate columns to obtain the total D. lat. and Dep. made good. All distances are in nautical miles, which are practically equal to minutes of latitude. Therefore, by applying the D. lat. to the lat. left, the lat. in is obtained. But the length of a minute of longitude on the earth's surface varies; on the equator it is equal to a minute of latitude, but decreases to zero at the poles. It is necessary, therefore, to find the D. long. corresponding to the departure from the formula, D. long. = Dep. × secant of middle lat.

Position by Observation.—For this a sextant, a chronometer, and the Nauticut Almanuc for the current year are required, in addition to the tables. Under favourable conditions the exact position may then be found within a

margin of a mile.

Finding the Latitude. -- The simplest method of doing this is by a meridian altitude of the sun or a star. It is customary to take the meridian altitude of the sun every day. Just before noon the observer measures the altitude of the sun's lower limb above the visible horizon with a sextant, and repeats the observation at frequent intervals until the sun attains its maximum altitude. It is then apparent noon at ship, and the last altitude, as read from the sextant, is the observed meridian altitude. The indexerror of the sextant, if any, is applied, and then the following corrections -dip of the horizon due to the height of eye, refraction, parallax, and the sun's semi-diameter: the result being the true altitude. These corrections are given combined as one in the nautical tables. The time at Greenwich is found by applying the longitude expressed in time $(15^{\circ} = 1$ hour) to the ship time; or the mean time at Greenwich can be obtained from the chronometer. The declination corresponding to this time is then obtained from the Nautical Almanac (N.A.). The true altitude subtracted from 90° gives the zenith distance, or arc of the meridian between zenith and the sun. The zenith distance is named opposite to the sun's bearing at noon. The declination is the arc of the meridian between the sun and the equator. The sum of these arcs is taken if they have like names, but their difference if unlike names: the result is the latitude. The proceeding for a star is similar, the correction for a star's altitude being used instead of the sun's. The moon also could be observed; but the calculation is longer, on account of the moon's rapid change of declination.

Latitude by Reduction to the Meridian.—When a meridian altitude is not possible, the navigator finds his latitude by reduction to the meridian. An altitude of the sun is taken as near noon as opportunity allows, and the exact time from apparent noon, found either from a watch the error of which on apparent time at ship is known, or from the chronometer

time, longitude, and equation of time. A quantity termed the 'reduction' is then either calcutime. lated, or more generally taken from tables, such as Towson's Ex-Meridian Tables. The 'reduction' added to the true altitude gives the true meridian altitude, after which the latitude is found as in meridian altitude. A star may be used in a similar manner, the Ex-Meridian Tables being entered with the star's hour angle instead of the time from noon. The latitude may easily be obtained from an observation of the pole star. Its true attitude sold found, certain corrections depending upon the time of observation are taken from the N.A. and applied, the result being the latitude.

Longitude by Observation.—For this the navigator depends upon his chronometer. The longitude of any place is equal to the difference between the time at that place and the corresponding time at Greenwich at the same instant. The apparent time at ship is deduced from an altitude of the sun. The time by chronometer is taken simultaneously, and with its known error the mean time at Greenwich is found: the equation of time applied to this gives the apparent time at Greenwich. The difference between the apparent times at ship and at Greenwich is equal to the longitude in time, which is then converted into arc. The declination is obtained from the N.A., and from it the sun's polar distance, which = 90° + declination when it is of opposite name to the latitude, but 90° - declination when of the same name. The three sides of the spherical triangle formed by the polar distance, zenith distance, and colatitude are then known, and from this the sun's hour angle or time from apparent noon at ship is calculated by spherical trigonometry.

The nautical tables contain the logarithms for effecting these calculations. By using Davis's chronometer tables, the hour angle corresponding to the altitude, latitude, and declination can be taken out almost by inspection, thus abbreviating the work. When a star is observed, its true altitude is obtained, and then its westerly hour angle + its right ascension = the sidereal time at ship. The sidereal time at Greenwich is then found from the mean sun's right ascension and the mean time at Greenwich. The difference between these sidereal times is the longitude.

Longitude by Lunar Distance.

—This method is not much used since the chronometer has been brought to such perfection.

Finding Latitude and Longi-

tude simultaneously. - To find both co-ordinates, two observaeither be two altitudes of different objects, such as two stars, taken at the same time, or two altitudes of the same object taken at different times. If an altitude of some object is taken, it is then known that the ship is somewhere on a small circle, the pole of which is vertically under the object, and whose spherical radius is equal to the zenith distance. Two such circles will fix the position of the ship, which must be at that point of intersection nearest the ship's position by D.R. The best result will be obtained when the circles cut orthogonally. This will be the case when the bearings of the objects form a right angle. No appreciable error will be introduced if small portions of these circles in the neighbourhood of the ship are considered as straight lines (unless the altitude is over 70). It makes the calculation much easier than the rigorous but cumbrous method of spherical trigonometry. The mode of procedure is as follows: Two latitudes 10' to 20' on each side of the lat. by D.R. are assumed, and the longitudes corresponding to these are calculated from the altitude of one of the objects. These two positions are then marked on the chart, and the line joining them forms one line of position. By proceeding in a similar manner with the other altitude a second line of position may be drawn, and their point of intersection fixes the ship's position. This is known as Sumner's method. The calculation may be much abbreviated by the use of Burdwood's and Davis's Azimuth Tables. An excellent practical method is that introduced by A. C. Johnson in his On Finding the Latitude and Longitude in

Cloudy Weather (27th ed. 1904).

Directing the Course.—The shortest distance between two points lies along the great circle passing through them; but it is not always possible to follow this track, as it may extend to too high a latitude. The prevailing winds and current have also to be considered, especially in a sailing-ship. Experience has shown which are the best tracks to follow between any two ports, and the navigator fixes certain points through which he intends to pass. The true course from point to point is easily found from the chart, or can be calculated from the formula: tan true course: D. long. ÷ meridional D. lat. All nautical tables give a table containing meridional parts. After finding the true course, allowance is made for the variation and deviation in setting the course to steer by compass. The error of

the compass is found at frequent intervals throughout the day as it changes with a change of position or course, or if the vessel heels over. In the present day this is easily done by the Time Azimuth Tables. A compass bearing of the sun is taken, and the apparent time at ship noted. Entering the tables with the time, and the latitude and declination, the true azimuth or bearing of the sun is obtained. The difference between the true and observed bearings is the error of the compass-i.c. the variation and deviation combined. Any object besides the sun may be observed in a similar manner. The error may also be found by an amplitude or bearing of an object when rising or setting, and in this case the time is not necessary, except for roughly correcting the declination. The true amplitude can be taken out by inspection from the tables for the latitude and declination, and the difference between it and the observed is the error.

Navigation Acts, a long series of acts between 1381 and 1833 passed to encourage, by the exclusion of foreign competitors, the ships, seamen, and commerce of Great Britain. The principal act was that of 1660, which provided, subject to certain exceptions, that no goods might be imported into England or its dependencies in any other than English bottoms, and that the master and three-fourths of the mariners should be British subjects. The last restriction on the trade of foreign ships in British deminions was removed in 1854, when foreigners were allowed to engage in the coasting trade; but by the Customs Act, 1853, if British ships are prevented from trading in foreign countries similar restrictions may be imposed on ships of those countries in British possessions.

Navigator's Islands. See SAMOA.

Naville, EDOUARD HENRI (1844), Swiss Egyptologist, horn at Geneva. In 1874 he was commissioned by the Congress of Orientalists (London) to edit the Book of the Dead, which appeared in 1886 as Das ägyptische Todtenbuch der 18 bis 20 Dynastie. Since 1882 he has been exploring in Egypt for the Egypt Exploration Fund, and discovered, in conjunction with Mr. H. R. Hall, in 1903 4, at Thebes, the mortuary chapel of King Mentuhotep of the 11th dynasty. In 1891 he was appointed professor of Egyptology at the University of Geneva. He has published memoirs on The Store City of Pithom (1885), Goshen and the Shrine of Saftel-Henneh (1887), Deir el-Bahari (1894-1901).

Navy. See NAVIES.

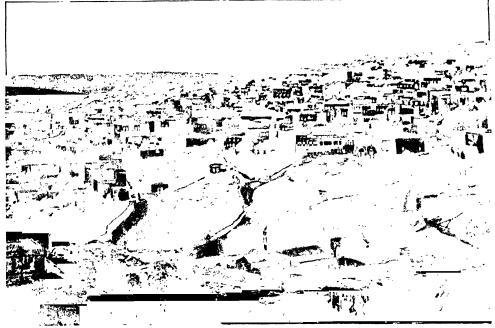
Navy Board, THE, the body of commissioners by whom the civil and administrative work of the royal navy was conducted, with but brief intermissions, between April 1546 and June 1832. The duties of this board are now performed by the Lords of the Admiralty, and by various heads of departments subordinate to them.

Navy League, The, a strictly non-party organization, to urge upon government and the electorate the paramount importance of an adequate navy as the best guarantee of peace. It publishes The Navy League Journal (monthly), and books and pamphlets, employs lecturers, and,

Nawanagar, or JAMNAGAR, feudatory state, Kathiawar, Bombay, India. Area, 3,393 sq. m. The chief town, Nawanagar, is a flourishing scaport, 310 m. N.W. of Bombay. It manufactures gold and silk embroidery and perfumed oils. Pop. (1901) 53,844.

Naxos. (1.) The largest and most fertile of the Greek islands called the Cyclades, in the Ægean Sea. Length, 15 m. Pop. (1896) 15,608. Its chief products are wine, corn, oil, cetten, fruits, and emery. There are marble quarries, worked as early as the 6th century B.C. About 1009. B.C. it was colonized by Ionians. With the rest of Ionia it was con-

Jesus from his connection with Nazareth (Matt. 2:23)—intelligibly enough; the difficulty is however, that the reference there given to the 'prophets' cannot be verified from their extant writings. For various theories, see, for example, Century Bible, Matthew, p. 128 f. note. The name Nazarenes was used of the Christians (Acts 24:5), and seems also to have indicated a sub-section of the Ebionites, which, according to Jerome, had a settlement at Pella at the close of the 4th century A.D. See Lightfoot's Galatians, 292 f., and contra, Harnack's History of Dogma (index).



Nazareth, from the road to Cana.

generally, enlightens the public as to the state of British and foreign navies, and of the development of naval warfare The organization was founded in 1895.

Navy Records Society, The, a society established in London in 1893 for the publication or reprinting of documents and works bearing upon the history of the royal navy. Its foundation was due to a suggestion put forward by Professor J. K. Laughton, which was warmly taken up by Admiral Sir Cyprian Bridge and the late Marquis of Lothian.

Nawabgani, cap., Bara Banki dist., United Provinces, India, 16 m. N.E. of Lucknow; exports sugar and cotton. Pop. (1901) 7,047. quered by the Persians; after the Persian wars it joined the Athenian League, and was the first city to attempt rebellion, and to be subdued (469 B.C.). Naxos, the capital, is on the N.W. const. Its chief feature is a Venetian castlc. Pop. 2,000. (2.) A colony from Naxos, founded on E. coast of Sicily 735 B.C.; was the first Greek settlement in Sicily. In 403 B.C. it was destroyed by Dionysius of Syracuse; in 358 its scattered inhabitants were resettled at Tauromenium (Taormina).

Nazarene and Nazarenes. There is considerable variety of opinion among scholars as to the significance of both these words. Nazarene is an epithet applied to

Nazareth, tn., Galilee, Palestine, about half-way between the s. end of the Lake of Galilee and the Mediterranean, on the slope of a hill 1,600 ft. high. The district around is remarkably fertile. Josephand Mary resided hereboth before and after the birth of Jesus (Luke 1:26; 2·4, 39: Matt. 2:23), and the village continued to be the home of Jesus until He began His ministry (Luke 2:51; 4:16; Mark 1:9; Matt. 4:13). The modern town En-Nasira has 10,000 inhabitants. The so-called 'holy house' is a cave under the Latin church. None of the traditional sites have any authority. See Edersheim's Life and Times of Jesus, i. 144 ff.

Nazarites, properly Nazi-RITES, a name borne in ancient Israel by those who were conse-crated to the Lord. Their vow embraced abstinence from wine, from the practice of cutting the hair, and from contact with dead bodies (Num. 6:12). The vow bodies (Num. 6:12). The vow might be temporary, in which case its termination was celebrated by sacrifices; but it was sometimes lifelong, as in the case of Samuel, Samson, and John the Baptist (Nazarites from birth); cf. the Rechabites (Jer. 35). The wilful repudiation of the vow was always regarded as highly sinful; cf. Amos 2:12. Nazianzen. See Gregory

Nazianzen.

Nazrana, or Nazars, in India, an offering of cash or goods made by any one entering the service of a native chief, or paid by a native Neal, DANIEL (1678-1743), English historian, was born in London, and from 1706 until his death ministered to an Independent congregation in Aldersgate Street, London. His History of New England (1720) was followed by the *History of the Puritans* (1732-8), which was carried down to 1689. See Life by Toulmin (prefixed to the History of the Puritans, 1793-7).

Neal, JOHN (1793-1876), American author; established a legal practice at Portland, Maine. During a stay in England (1823-7), he acted as secretary to Jeremy Bentham. Among his novels are Seventy-Six, and Randolph (1823), Logan (1823), and The Down-easters (1833). He translated easters (1833). He translated Bentham's Theory of Legislation from the French of Dumont (1825), and wrote a Life of Bentham



history at Heidelberg in 1811, and at Berlin (1812-50). His principal

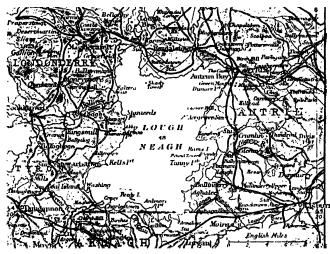
works are Ueber den Kaiser Juli-anus (1812); Der heilige Bernard (1813); Die gnostischen Systeme

(1818); Chrysostomus (1822); Antignostikus (1825), an essay on Tertullian; Denkwürdigkeiten aus der Geschichte des Christenthums (1822); Allgemeine Geschichte der christlichen Religion u. Kirche (1826-45); Geschichte der Pflan-zung der christlichen Kirche (1832); Leben Jesu Christi (1837); and ChristlicheDogmengeschichte Nearly all these are (1857). translated into English. Neander was a tower of strength against the rationalism of his time. He joins vast crudition with deep spiritual insight. See monographs by Krabbe (1852), Jacobi (1882), Wiegand (1889), and Harnack (1889).

Neanderthal Man, a very low type of European, long extinct, represented by a skeleton found in 1856 in the Neanderthal, near Düsseldorf. The skull, which is very thick and unusually large, is dolichocephalic, with a cephalic index of 72 mm., and is remarkable for its low forehead, its enormous superciliary ridges, and enormous superchary ridges, and an exceptional projection of the occipital region. Skulls presenting almost identical characteristics have been found at Spy (Belgium), Cannstatt (Würtemberg), Egisheim (Alsace), and Tilbury (Lunden). Do Mertillet bury (London). De Mortillet, in his Formation de la Nation Française (1897), concludes that Neanderthal man walked with a slouching gait.

Neapolis. (1.) Ancient name of Naples. (2.) Ancient tn., seapt. (9 m.) of Philippi, in Macedonia. Kavalla is probably on or near the site. For Paul's association with the town, see Acts 16:9-11.

Nearchus, officer of Alexander the Great, who in 326 B.C. was put in command of a fleet which sailed down the Indus and along



Lough Neagh.

chief to the paramount power on succession to the throne. Nazars in cash are presented at durbars by chiefs to the representatives of the suzerain power. These gifts are either touched and remitted, or, if accepted, a return present of greater value is made to the donor.
N.B. (nota bene), 'mark well;'
North Britain (Scotland), New

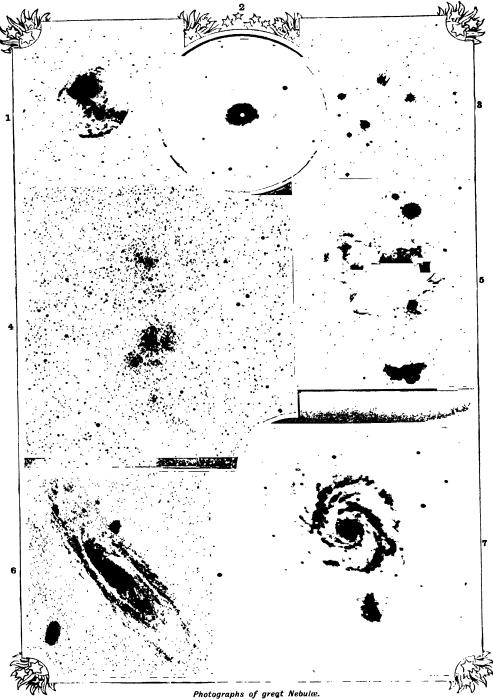
Brunswick.

Neagh, Lough, lake in Ulster, Ireland, the largest in the British Isles. The coast is much indented. Ram's Island has remains of a round tower. The principal rivers entering the lake are the Upper Bann and the Blackwater. The Lower Bann drains to the Atlantic; and in s.r. the Lagan navigation connects with Belfast Lough and the Ulster Canal. Length, 20 m.; average breadth, 10 m. Area, 153 sq. m.

and Wandering Recollections of a Somewhat Busy Life (1869)

Neale, John Mason (1818-66), English divine and author, was born in London, and became a priest of the Anglican Church (1841). While warden of Sack-ville College East Gripated (1841). While warden of Sack-ville College, East Grinstead, where he spend the last twenty years of his life, he founded a nursing sisterhood of St. Mar-garet. Among his works are a History of the Jews (1841), and Introduction to the History of the Holy Eastern Church (1850). He is author or translator of nearly one-eighth of Hymns Ancient and Modern.

Neander, JOHANN AUGUST WILHELM (1789-1850), German Church historian, was born of Jewish parents at Göttingen. After being baptized in 1806, he Jewish was appointed professor of church



1. Dumb-bell nebula in Vulpecula. (Lick Observatory.) 2. Ring nebula in Lyra. (Lick Observatory.) 3. The nebula in the Pleiades. (By Dr. Isaac Roberts. By permission of his executors.) 4. Nebula in Argus. (Bydney Observatory.) 5. Great nebula in Orion. (Yerkes Observatory.) 7. Great spiral nebula in Canes Venatici. (Lick Observatory.)

the S. coast of Baluchistan and Persia, and up the Persian Gulf and the Euphrates to Babylon (324 B.C.). Nearchus left an account of his voyage, the substance of which is preserved in Arrian's Indica.

Nearctic. See GEOGRAPHICAL DISTRIBUTION.

Neath, seapt. and mrkt. tn., Glamorganshire, S. Wales, 7 m. E.N.E. of Swansea: has steel works, galvanizing works, tinplate works, engineering shops, foundries, chemical works, and firebrick works. It belongs to the Swansea district of parliamentary boroughs. There are remains of an ancient castle and of an abbey founded about 1130. Pop. (1901) 13,732.

Neat's-foot Oil is properly obtained by boiling the feet of cattle, though horses' and sheep's feet are often substituted. It consists chiefly of olein, and is of pale vellow colour and without odour.

Studies, 309 f.); also as a designation of a mountain and town in Moabite territory.

Nebraska, N. central state of U.S.A., with an area of 77,510 sq. m. It was organized as a territory in 1854, and admitted as a state in 1867. Its surface is a plain, with a general E. slope, ranging from 1,000 ft. above sealevel at the Missouri, its E. boundary, to 5,000 ft. in the w. In this plain the river Platte and its branches have cut shallow valleys The rainfall is scanty in the w., and irrigation is resorted the W., and Irrigation is resorted to. The state is practically almost treeless. The capital is Lincoln, and the chief city is Omaha, on the Missouri. The industries are almost purely agricultural and pastoral. South Omaha carries on slaughtering and meat packing. Pop. (1900) 1,066,300, of whom 52'9 per cent. were males, and 47'1 per cent. females.



Nebraska.

It does not easily solidify on cooling, become rancid, or clog, and is a valuable lubricant for finer machinery. It is also used in

machner,.
Neaves, Charles, Lord
Neaves, Charles, Lord
Neaves (1800-76), senator of the
Scottish College of Justice, was
a native of Edinburgh. He was
successively advocate-depute
(1841-5); sheriff of Orkney and
Shetland (1845-52); solicitorgeneral (1852-3); judge in the
Court of Session (1853), and became a lord of justiciary (1858).
He wrote sparkling and witty
verse (Songs and Verses, 1868).
Nebo, Mount. See Abarim.

Nebo, MOUNT. See ABARIM.
Nebo, a Babylonian deity, the
interpreter of Bel-Merodach, and
the patron of literature and science. He was the son of Merodach, and had a temple at Borsippa. His name appears in
Nebuchadnezzar, Nebuzaradan,
Abednego (for Nebo); perhaps
in Barnabas (Deissmann's Bible

Nebraska City, city, Nebraska, U.S.A., co. seat of Otoe co., 45 m. s. of Omaha. Pop. (1900) 7,380.

Nebuchadnezzar, more correctly, Nebuchalnezzar, founder of the Babylonian empire, was the son of Nabopolassar, and reigned 604-561 B.C. Towards the close of his father's reign he defeated Pharaoh Necho at Carchemish (605 B.C.); he reduced Tyre, which had revolted, after a siege of thirteen years; invaded Judah in 598, 597, and 588 B.C., finally destroying Jerusalem and deporting the inhabitants (586). He lavished stupendous sums in the erection of fortifications, temples, and palaces, thus making his capital one of the wonders of the world.

Nebula, a cloudlike sidereal object irresolvable into stars. The great nebular ellipse in the girdle of Andromeda noted in the 10th century, and the 'fish-

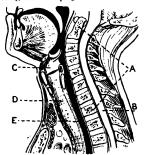
mouth' formation in Orion observed in 1618, typify respectively the two leading varieties. White nebulæ give a faint continuous spectrum; they are mostly elliptical or spiral in structure; and they crowd towards the poles of the Milky Way. About 9,000 have been already catalogued, and their numbers may be almost indefinitely increased by photographic charting. Gaseous nebulæ were discovered as such by Sir William Huggins in 1864. They shine with a greenish light, analyzed by the spectroscope into three conspicuous green rays, besides some thirty-five others in the blue and ultra-violet. Their chief constituent is the unknown substance nebulium, with which hydrogen and helium are associated. All the great irregular nebula, as well as those of planetary and annular forms, are gaseous. Only a few hundreds, however, have yet been registered; and they tend to congregate in the plane of the Milky Way. Dr. Max Wolf has begun at Heidelberg a photographic nebular survey, the first volume of which was published in 1902. The distances of nebulæ from the earth are probably enor-None has a measured mous. parallax or an ascertained proper motion, though their radial velocities, determined by Keeler in 1890-1, are comparable to those of the stars. They often occur in pairs and groups, but give no signs of mutual revolution. few are variable in light-notably one in Taurus discovered by Hind in 1852 (N.G.C. 1555); and many are attached to stars as brushes. trains, or halos—e.g. in the group of the Pleiades.

Nebular Hypothesis, a speculation regarding the origin of the planetary system, propounded in an imperfect form by Kant in 1757, and with fuller knowledge by Laplace in 1796. See Cos-MOGONY.

Necessaries. See Infant, and Husband and Wife.

Necessity. By the necessity of a proposition or judgment is meant that logical certainty which attaches to it in virtue of its self-evidence or full demonstration, and which compels us to accept it as true. A distinction, of much importance in the history of philosophy, has been drawn between necessary and contingent truths, as by Leibniz (Monadology, sec. 33): 'There are two kinds of truths—those of reason and those of fact. Truths of reason are necessary, and their opposite is impossible; truths of fact are contingent, and their opposite is possible.' For example, the proposition that two sides of a triangle are together

greater than the third could not be rejected without inherent contradiction; but there is no such apparent necessity that any given historical event must have happened just as it did happen. But this distinction would not now he accepted by a thoroughgoing logic as ultimate. It would rather be held that necessity is a characteristic which pertains to all knowledge in so far as the latter is definite and systematic, and which does not belong to any one class of judgments excludepartment of knowledge be-comes, the more the character of necessity attaches to it, and therefore to all the propositions included in it. Thus, when the necessity of a causal sequence is asserted, the assertion means simply that we do not recognize chance as anything real or objective. When the conditions of an event are fully present, there is no room left for the event to happen in any other way than the conditions determine. But it should be added that necessity in this very general sense is not to be conceived as exclusively of the mechanical type which is recognized in physical science.



Diagrammatic Section of the Neck

A, Cervical vertebra; B, spinal cord; c, larynx; D, trachea; E, esophagus.

(1.) In anatomy, that Neck. part which lies between the head and trunk The cervical part of the spinal column, protecting the spinal cord and supporting the head, lies at the back of the neck, covered by masses of muscle for keeping the head erect or drawing it back. The lowest cervical vertebra is easily felt just under the skin. In front, in the middle line, the cartilaginous larynx and trachea can be felt; and behind them lies the soft muscular tube, the gullet or esophagus. On either side of the middle line lie large muscles for supporting and moving the head, large arteries, veins, and nerves, each side being a duplicate of the other. (2.) In geology, the name given in former volcanic craters to the conduit up which the lavas arose. Necks are found in all old volcanic districts—e.g. Arthur's Seat, North Berwick Law, Dumbarton Hill (in Scotland), in Auvergne, in the Eifel, in Bohemia, Texas, and California. The most famous examples are the diamond mines of Kimberley, South Africa, where the diamantiferous 'blue ground' is a breciated igneous rock, occupying a cylindrical conduit, the walls of which are nearly vertical.



Diagrammatic Section of Arthur's Seat, showing volcanic neck, N.

Neckar riv., trib, of Rhine, rises between Black Forest and Swabian Jura, in s.v. of Würtemberg and flows N.E., N.W., and W., and joins the Rhine at Mannheim, after a course of 247 m.

Necker, JACQUES (1732-1804), French financier, was born at Geneva, where he founded (1762) a bank which became one of the most famous in that part of Europe. In June 1777 Louis XVI. made him controller-general of finances; but he seems to have been little more than a first-class business man and manipulator of figures. He managed to restore the credit of the French treasury for a time; but his economies were more than neutralized by the war with England on behalf of the American colonies. In 1781 Necker ap-pealed to public opinion by the publication of the Compte Rendu, a statement of the financial position of France. It is now held to have been too optimistic in many particulars, and to have con-cealed the real bankruptcy of the country. But its importance consisted in the fact that for the first time the public of France learned on official authority the incidence of the burdens of the state in all their injustice. Necker's dismissal in 1781 made him a popular hero. He was re-called in 1788 and made directorgeneral of finance; but his second dismissal, on July 11, 1789, was one of the direct causes of the attack on the Bastille. He was recalled a second time on July 20, as a consequence of the popular victory; but he was quite unequal to the situation, and resigned in September 1790. His Euvres Complètes appeared in 15 vols, (1820-1). See Mme. de Staël (his daughter), Vie Prirée de M. Necker (1804); and Hermann, Zur Geschichte der Familie Necker (1886).

Necker, SUZANNE CURCHOD, MADAME (1739-94), was born near Lausanne, and was at one time engaged to Gibbon the historian. The wife of the financier, her sudon in Paris was famous. She wrote treatises on literary and moral topics, collected as Metanges in 5 vols. (1798-1802). Her daughter was Madame de Staël. See D'Haussonville's Le Suton de Mmc. Necker (Eng. trans. 1882).

Necklace, Diamond. See DIAMOND NECKLACE.

Necromancy, the practice of the black art, enchantment, and magic in general. See DIVINA-TION.

Necropolis, a city of the dead; especially applied to a cemetery of the ancient world, and to any burying-ground in modern times. The most celebrated necropolis was the so-called suburb of Alexandria, the scene of the suicide of Cleopatra. The only remains are a series of catacombs.

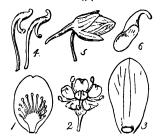
Necrosis, in pathology, the death of circumscribed portions only of bodily tissue, most frequently the death of bone. Tissues necrose through localized failure of nutrition, by the cutting off of the blood-supply, by suppuration, or after severe local injury, such as crushing. Necrosis in bone follows after destruction of periosteum, the protective covering through which the blood-vessels enter bone. The surgeon's aim is to remove the sequestrum.

Nectar, the sweet secretion of certain organs present in a large number of flowers, and the source of honey. By means of its nectar a flower attracts insects, which, by conveying pollen from the stamens of one flower to the stigma of another, bring about cress-fertilization.

Nectar, the name given by Homer to the drink of the gods of Olympus, their food being ambresia. It was red-coloured, and mixed with water, like wine. Mortals were not permitted to taste of it, as to drink it conferred immortality.

Nectarine, a fruit which, for its successful culture in Britain, requires a south wall or the protection of a glass-house, and a deep, well-drained, open loamy soil. It should be planted about the end of September, and the surface of the soil above the roots should be covered with long litter. In most soils budded trees do far better than trees on their own roots. Every January the wood which has horne fruit in the previous season is cut out, the last season's new shoots being left intact or but very slightly shortened. The general treatment is similar to that for the peach, of which indeed the nectarine is a variety.

Nectary, the organ or floral part of a flower whose function it is to produce nectar from the fluids circulating in the plant tissues. In most umbelliferous plants the nectary is almost on the surface, for these plants are fertilized by flies; whereas in the honeysuckle, which is crossfertilized by moths, the nectary is at the bottom of a long tube, and can only be reached by an insect with a long proboscis.



Types of Nectary.

1. Parnassia (fingered nectary).
2. An umbelifier (parsley).
3. Fittillaria.
4. Aconite.
5. Tropeolum.
6. Aquilegia.

Nederland Steamship Line, THE, was established in 1870, under a subsidy from the Netherlands government, and has a fleet of seventeen steamers aggregating 66,113 tons, the largest vessel being the Oranje (4,500 tons). Originally formed only to carry passengers and cargo between Holland and Java, the company now runs a mail service from Amsterdum viā Southampton to Port Said and Suez, and has also a combination service with the Rotterdam Lloyd, which runs to Java from Rotterdam.

Nedim (fl. c. 1700-30), Turkish poet, acted as custodian of the library founded at Constantinople by Ibrahim Pasha, grand vizier. He exhibits greater originality, grace, and power than any other Turkish poet.

Needle, an instrument used to carry the thread in sewing, knitting, embroidery, etc. Needles are now generally made of fine steel, but bone, ivory, and wood are also used. The manufacture of needles is an important industry. After a suitable wire has been chosen, it is cut out into one hundred eight-foot lengths, and again into lengths of two needles. These are collected into bundles, slightly softened by firing, and pressed to make them perfectly straight. They are then pointed at both ends by a grindstone, and whee eyes punched by dies, broken apart, polished, tempered, and the heads ground into shape.

Needle, MAGNETIC. See COM-PASS.

Needle-gun. See RIFLE.

Needles, THE, group of three rocks off w. point of Isle of Wight, England. The original 'needle,' a slender pinnacle 120 ft high, fell in 1764. They were formerly connected, but the sea pierced them before 1820.

Needlework. In sacred writings frequent montion is made of needlework. Aholiab, of the tribe of Dan, celebrated as a skilled embroiderer, was chosen to execute the beautiful hangings of the tabernacle. Tents occupied by primitive man were embellished with devices in needlework. The Greeks attributed the invention of needlework to Minerva, and Grecian women excelled in the art. Homer makes Helen weave and embroider the story of the siege of Troy; and the same authority has familiarized us with the stories of Penelops and her web, and the ambitious challenge to a test of needlework skill sent by Arachne to Minerva.

The early Britons were accomplished in needlework, for Boucious on the day of her defeat worearielly-embroidered mantle. Anglo-Saxon women won fame all over Europe for their skill in needlework. In the days of chivalry exquisite work was done on the banners, scarfs, and surcoats and ecclesiastical hangings and vestments. Tapestry—a combination of embroidery and weaving—played a prominent part at this period. The historical Bayeux tapestry worked by Queen Matilda is one of the most celebrated specimens.

The degeneracy of nee llework in England dates from the reformation. In the time of James I. portraits were executed in needlework, in which the face and background were often printed. During the reign of Charles I. hangings and furniture were worked in woollen crewels—a style which found favour until the reign of Queen Anne. After that followed revivals of coloured embroideries executed in wools and silks of curious designs of fruit, flowers, birds, and animals; as well as print-work, an imitation of stippled engravings worked in threads of black and gray on a white silk ground. Cross-stitch samplers, on which were represented alphabetical letterings, quaint devices, landscapes, trees, and flowers, were also popular. Then came Miss Linwood with her celebrated series of sixty-four pictures in needlework. The various operations in the making of personal and household linen formed an important branch of female education. But the advent of the sewing-machine obviated the necessity for expending so much time and skill on hand work. Nevertheless, dainty, well-executed

plain needlework has been gaining more appreciation in recent years. During the early Victorian era a popular form of embroidery was the open-hole cambric work, which has been revived recently. Tambour work (a species of chainstitch executed with a hooked needle on muslin, cambric, net, or silk), designs darned on coarse net, and plain and ornamental notting, were also in vogue. Appliqué work, in which designs cut out in one material are placed on to a contrasting fabric, and the edges secured by buttonholing or by braiding, also found favour. Berlin-wool work, which is cross-stitch worked in wools on canvas, and in most elaborate designs, embellished footstools, hand-screens, and other articles of furniture. Coloured beads were also employed in this form of ornamentation. Tatting-done by mouns of a small hand-shuttle made of bone or wood, with cotton or linen thread-was much used in making collars and edgings; and crochet, which calls for a hooked bone or steel needle used in conjunction with thread or wool, also attracted much attention. Knitting was pursued for hosiery, gloves, and shawls Then came crewel work, a most inartistic and crude revival of embroidery in The establishment of the wools. The establishment of the Royal School of Art Needlework at S. Kensington in 1872, and the constant encouragement extended in high quarters to the reinstating of needlework as a fine art, have resulted in remarkable improvement of design and treatment. Embroidery of a natural or conventional nature is now beautifully executed in silks. wools, and flax, and is used largely for decorating ladies' dresses and every kind of house draperies. Drawn thread work, which consists in removing the cross threads from linen or canvas and embroidering the remaining threads into cunning designs containing whorls, cobwebs, hem-stitching, and buttonhole work, is much used. Ribbon embroidery, originally a French work, and composed of light and graceful patterns formed by stitches made with soft, pliable ribbons, is also popular for dress garniture and decorative purposes. A description of raised embroidery in white cotton, applied to linen white cotton, applied to all an articles, is very effective, and is known by the name of Mount-mellick work. The introduction of flax thread, dyed, has done much towards improving embroidery and outline work. Russian cross-stitch, worked in coloured threads on soft canvas fabrics, or applied to linen by means of working over stiff canvas attached to the linen, and withdrawing the canvas threads after the design is worked, is executed in elaborate designs, Church embroidery shows much painstaking and very beautiful work, different in treatment from any other style of artistic needlework. Crochet is capable of beautiful effects, such as those which are displayed in the exquisite Irish crochet laces, collars,

and trimmings.

See Necdlework as Art, by Lady M. Alford (1886); Dictionary of Necdlework, by S. F. A. Caulfield and B. C. Saward (1881); The Art of Needlework from the Earliest Ages, by the Countess of Wilton (1844); Needlework for Ladies, by 'Do-'Dorinda' (1883); Needlework, by E. Glaister (1880); Embroidery, its History, Beauty, and Utility by E. E. Wilcockson (1857); Art Needlework, Embroidery in Crewels, Silks, and Applique (1882); Elementary Needlework, by the Silkworm' (1875); Illuminated Book of Needlework, by Mrs. H. Owen (1847); Ancient Needlework and Pillow Lace, by A. S. Cole (1875); Universal Guide to Art Embroidery (1882); Home Decoration, Art Needlework, and Embroidery, by J. E. Runtz Rees (1881); Artistic Embroidery, containing practical illustrations (1880); La Broderie (1864); The Handbook of Needle-work, Decorative and Ornamen-tal, by Miss Lambert (1864); Encyclopædia of Needlework, by Thérèse de Dillmont (1890); and Art in Needlework, by Lewis Day (1900).

Neenah, city and summer resort, Winnebago co., Wisconsin, U.S.A., on Lake Winnebago, 80 m. N.W. of Milwaukee. It manufactures paper, lumber, and flour. Pop. (1900) 5,954.

Neerwinden, or NERVINDE, comm., prov. Liège, Belgium, 2 m. w.n.w. of Landen. Here the allies, led by William of Orange, were defeated by Marshal Luxembourg in 1693; and in 1793 Dumouriez, the French general, was defeated by the Austrians.

Ne Exeat Regno, a prerogative writ issued to prevent a person from leaving the kingdom, now very seldom used; but by the Debtors Act, 1869, a plaintiff who proves that he has a claim against a defendant for £50, and that there is some reason to believe that the defendant is about to leave the kingdom, and that the plaintiff will suffer thereby, may obtain an order detaining the defendant for six months, or till he gives security.

Neff, FELIX (1798-1829), Protestant pastor, native of Geneva; laboured devotedly in a large parish of Hautes-Alpes, France. See Memoir by Gilly (1832), and Correspondence and Biography by Bost (Eng. trans. 1843).

Nefi (d. 1635), Turkish poet, who produced not only eulogies of considerable power and brilliancy, but satires, which led to his execution, through the action of

powerful enemies.

Negapatam, munic. tn. and chief port, Tanjore dist., Madras, India, 50 m. s.e. of Tanjore; one of the earliest settlements of the Portuguese on the E. coast. It was taken by the Dutch in 1660, and by the British in 1781. Oil is extracted, and here are the workshops of the Great Southern Railway. Pop. (1901) 57,190. Off the town Vice-admiral George Pocock brought to action the French fleet under Comte d'Aché in 1758: the fight was indecisive. Again, in 1782, another indecisive action was fought between Viceadmiral Sir Edward Hughes and the Bailli de Suffren.

Negaunee, tn., Marquette co., Michigan, U.S.A., 3 m. E. of Ishpeming, with iron mines and blast-

furnaces. Pop. (1900) 6,935. Negligence. Negligence is the omission to do something which a reasonable man, guided by those considerations which ordinarily regulate the conduct of human affairs, would do, or doing something which a prudent and reasonable man would not do. person who complains must prove negligence on the part of the defendant, and that he has suffered harm as the reasonable and probable consequence of that negligence. But even if the defendant has been guilty of negligence, if he can prove that the harm sustained by the plaintiff could have been avoided had the plaintiff himself exercised reasonable care, then the defendant will not be held liable. This is the doctrine of 'contributory negligence.' A man is liable not only for his own acts, but also for the acts of others employed by him, so long as they do not go beyond the scope of their authority. also EMPLOYERS' LIABILITY.) If a man undertakes by contract, express or implied, to perform some service that requires special skill or knowledge, he will be liable for negligence if he fails to exercise adequate skill or knowledge. Hence a doctor must treat his patient with medical or surgical knowledge or skill, and a solicitor must conduct his client's business with legal knowledge. Again, if a man under-takes the charge of gold or jewels, he must take greater care than would be required in the case of things of little value. (See CARRIER, and INNKEEPER.) The neglect of duties imposed by law upon various persons for the preservation or protection of life involves criminal responsibility in the event of some one being injured or killed. The commonest case at the present day is the prosecution of enginedrivers or signalmen in connection with railway accidents.

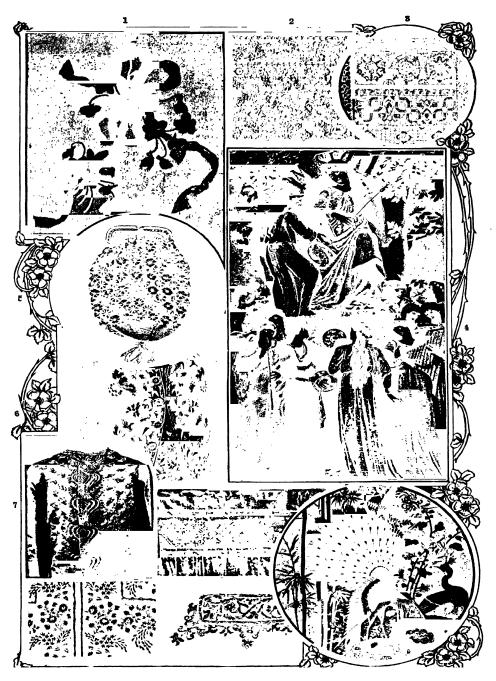
In England, but not in Scot-land, there is a rule of law that a personal right of action dies with the person; and if a man is killed by the negligence of another, his representatives have, apart from statute, no right of action for damages. Lord Campbell's Act (9 & 10 Vict. c. 93) gives a remedy by way of exception in certain cases, conferring a right of action on the personal representatives of a person whose death has been caused by a wrongful act, neglect, or default such that if death had not ensued that person might have maintained an action. The right conferred is only for the benefit of the wife, parent, hus-band, or child of the person killed. The damages must be assessed according to the injury or loss to the parties for whose benefit the action is brought, and apportioned an ong them by the jury. See Smith, On Negligence (2nd ed. 1884); Pollock, On Torts (7th ed. 1904); and Beven's Negligence in Law (2nd ed. 1895).

Negotiable Instrument. negotiable instrument is a document the mere delivery of which confers, by virtue of the law merchant or by Act of Parliament, a good title to the property secured thereby, on a transferee who acquires it in good faith and for value, and gives him a right to sue on it notwithstanding that the title of the person from whom he acquires it is defective. Bills of exchange, bank notes, promissory notes, and cheques (provided, if payable to order,' they are properly endorsed) are all negotiable instruments, but not bills of lading, iron warrants, or post-office orders. Modern decisions tend to establish the doctrine that the courts will give effect to a trade usage to treat a particular document as negotiable, although

such usage is of recent origin.

Negri, Add (1870), Italian
poetess, was born at Lodi, and
taught in a school at Motta Visconti (1888) till she suddenly rose to fame by the publication of Fatalità (1892), a volume of poems steeped in melancholy and bit-terness, and full of feeling for her fellow-sufferers the poorer classes. This secured her a post at the normal school of Gaetano Agnesi in Milan. In 1895 followed another remarkable set of poems, Tempeste, breathing socialistic ideals. Maternità (1904) contains some tender pieces, but as a whole is devoid of inspiration and true poetry. See Ada Negri, by Papa (1893) and Henckell

(1896).



Needlework.

Needlework.

1. Ribbon work on satin. (Royal School of Art Needlework.) 2. Gimp: raised flowers of coloured silk. 3. Cut and embroidered work on linen; English, 18th century. 4. Panel designed by Sir Edward Burne-Jones, embroidered in silks. (Royal School of Art Needlework.)

5. Purse, green silk, and gold and silver thread; English, 18th century. 6. Velvet coat embroidered in silk; English, 18th century. 7. Silk winter, embroidered with aliver-gilt thread; English, 18th century. 8. Silk waitscen, embroidered in silver-gilt thread; English, 18th century. 9. Cut and embroidered work on linen; Saracenic. 10. Scarf end: cut linen, covered with embroidery in silks and gold and silver taread; Italian, 16th or 17th century. 11. Japaneze silk embroidery. (Exhibited at the Royal School of Art Needlework.) The examples not otherwise allocated are in the South Kensington Museum.

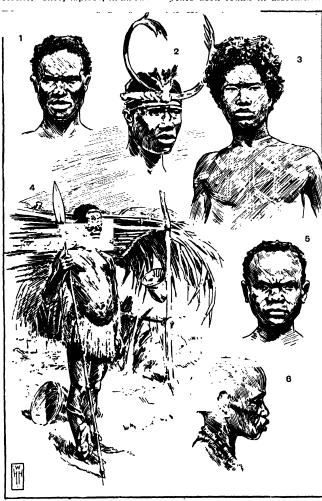
Negrl Sembilan, British protectorate of federated Malay states, N. of Malacca, in the Malay Peninsula. It is traversed by mountain spurs, which in McDphir (or Gunong Ledang) reach 3,840 ft. The higher valleys and ranges are very densely timbered, while the low grounds are very fertile. Rice, tapioca, india-rub-

Negrito, or NEGRILLO, a term applied by the early writers to the undersized black aborigines of the Philippine archipelago, and gradually extended to the similar groups in other parts of Malaysia and of Africa, as well as to the dwartish Negroid element whose remains have in recent years been found in association

largely intermingled with the Indonesian and Malayan intruders; (2) the Sakais, Samangs, Jakuns, and others dispersed over the Malay Peninsula, where few have preserved their racial purity; (3) the Andamanese (the 'Mincopies' of the early writers, the most typical of all the Oceanic ne-gritos. In Africa the pygmics, already known to the Egyptians of the first dynastics, are almost confined to the woodlands of the Congo and Ogoway basins, and of the lacustrine equatorial region. Here the best-known groups are the Wochua (Achua) and Akka of the Welle basin, the Batwa of the Kasai and other S. Congo affluents, the Wandorobo of Masailand, the Dume of S. Gallaland, and the Akongo (Obongo) of W. Equatorial Africa. The primordial unity of the Oceanic and African negritos is

established by common physical and mental characters e.g. a generally dark colour; very short, black, woolly hair; extreme prognathism; low stature, ranging from 3 ft. 6 in. to 4 ft. 10 in.; disproportionately large brachycephalous (short) head; very slender legs with undeveloped calves; the quick, fitful temperament of children; extremely low culture, shown by the absence of fixed abodes, of all arts, clothes, reliabodes, of all arts, clothes, religion, implements, except the bow and arrow. A family group of Congclese Negritos were 'exhibited'in London in 1905. See E. H. Man's 'The Andaman Islands and their Inhabitants,' in Jour. Anthrop. Inst. (1885); H. Clifford's International (1897). In Court and Kampong (1897); De Quatrefages' Les Négritos, in Bol. Soc. de Géogr. (1872), and 'Distribution Géographique des Négritos,' in Rev. d'Ethnographie (1882); Mikloukho-Maklay's 'Ethnological Excursions in the Malay Peninsula, in Jour. Straits Branch Pennsula, in Jour. Stratts Branch Asiatic Soc. (1878); A. B. Meyer's Ueber die Negritos oder Actas der Philippinen (1878); W. Jun-ker's Travels in Africa (Eng. ed. 1900-2); L. Wray's 'The Cave-Dwellers of Perak,' in Jour. An-throp. Inst. (1897); E. Tyson's Essay concerning the Pumics of Essay concerning the Pygmics of the Ancients (new ed. 1894); A. H. Kenne's Man, Past and Present (1900); G. Herve's 'Cranes Néolithiques Armoricains de Type Négroïde, in Bol. Soc. d'Anthrop. (iv. 1903); and W. A. Reed's 'Negritos of Zambales,' vol. ii. pt. i. Philippine Ethnology Survey (1904).

Negro, Rio, riv., Argentina, formed by junction of Neuquen and Limaz. The latter has its source in Nahuel-Huapi Lake, and the Neuquen in Malbarco Lake. The Negro flows E. and s.E., and enters the Atlantic after a course of 625 m. It is navigable to the mouth of the Limay. A bar obstructs its own mouth.



Negrito Types.
1. Malay. 2, 3. Philippine. 4. Andaman. 5, 6. African.

ber, cocoanuts, fruits, and spices are cultivated. Liberian coffee is grown. Tin-mining is important; gold and other minerals are also found. The chief town is Seramban. The inhabitants are Sumatran Malays. Area, 2,600 sq. m. Pop. (1901) 96,028. Trade in 1904—imports, £874,000; exports, £1,586,200.

with the men of the stone ages in various parts of Central and Western Europe They are divided by the Indian Ocean into two distinct sections—the Eastern (Oceanic) and the Western (African) negritos. In Oceania almost the only surviving groups are— (1) the Aëtas ('Blacks'), the true aborigines of the Philippines, now

Negroes, one of the four main divisions of mankind, so called from the blackish colour of their skin. This division comprised two great sections—the Eastern or Oceanic, and the Western or African negroes, now separated by the Indian Ocean; but probably they formed a continuous group before the subsidence of a postulated Indo-African continent in relatively recent geological times. The Oceanic section is discussed at POLYNESIA; the present article is confined to the African section-i.e. to the negroes proper The true negro element is mainly limited to the region between the Sahara and the equator. In the southern half of the conti-nent there are but few full-blood negroes. On the other hand, some 30,000,000 descendants of the slaves of plantation times still survive, and are increasing in the New World, so that the rough estimate of about 200,000,000 given by some authorities as the number of blacks of negro stock may not be excessive.

Co-ordinate with his blackish or very dark brown complexion, the true negro is distinguished by his coal-black, short and crisp or woolly hair, flat in transverse section; prognathous (projecting) jaws; nose short and very broad at base; eyes large, round, prominent, black, with yellowish cornea; distinct yellowish tinge on the palms and soles; cheekbone rather small, and slightly if at all prominent; lips tumid and everted, showing the red inner skin; arms disproportionately long; legs slender, with small calves; feet broad, flut, with low instep and larkspur heel; stature above the average (mean about 5 ft. 10 in.); skull very thick and dolichocephalous (long; cephalic index, 72°). All these characters, except the last, which varies considerably as amongst the Nilotic Bongos, Azandehs, and others, may be described as constant. Mentally described as constant. Mentally the negro occupies the lowest position, being greatly inferior in this respect not only to the white and yellow, but also to the red (American) races. This is associated with, and by some authorities attributed to, the early closing of the cranial sutures, by which the normal development of the brain is arrested. Hence the pure negro, bright and quick during childhood, remains a child throughout life, and, left to himself, is not only unprogressive, but incapable of upward progress. In the arts he does not go beyond husbandry, spinning, weaving and dyeing, pottery-making, wood-carving, the smelting and work-ing of iron and copper. The bronze plaques and figures in relief and on the round recently

brought to light in Benin (Slave Coast) are quite exceptional, and are due—at least in part—to European (Portuguesc) influences. With the culture corresponds a sensuous, indolent, and improvident temperament; fitful, passionate, and cruel, passing readily from comedy to tragedy, with little sense of personal dignity:

Haiti. The more advanced political and social relations amongst the Fulahs, Hausas, Songhays, Mandingans, and some other Sudanese peoples, are entirely due to miscegenation with their Mohammedan (Arab and Berber) conquerors. For the peculiarities of their agglutinative form of speech, and for the numerous



Mandingo.
 Hausa.
 Yoruba.
 Niam-Niam.
 Madi.
 Kru.
 Cross River (Niger Delta).
 Congo.

hence easy acceptance of the yoke of slavery; hence also the former universal prevalence of cannibalism, of human sacrifices to the dead at the periodical 'customs,' and of witchcraft, accompanied by unspeakable atrocities. And when control is removed there is a strong tendency to revert to the old barbarous rites and practices, as in the Black republic of

negro stock languages, see ETH-NOLOGY and PHILOLOGY. See W. Barth's Travels in Africa (5 vols. 1854); F. Manetta's La Razza Negra (1864); G. Schweinfurth's Heart of Africa (Eng. trans., 2 vols. 1873); Sir Spencer St. John's Hayli, or the Black Republic (1884); De Quatrefages' Les Races Humaines (1882); R. Brown's The Races of Mankind (4 vols.); F. G. Ruffin's Negro Education in Virginia (1889); F. L. James's The Wild Tribes of Sudan (1883); G. Nachtigal's Sahara and Sudan (3 vols. 1879-89); A. B. Ellis's The Tshi, Ewe, and Yoruba Speaking Peoples (1884, 1887, 1890); Sir H. H. Johnston's British Central Africa Jonnston's British Central Africa (1897); A. H. Keane's Africa (2 vols. 1895), Ethnology (1896), and Man, Past and Pres-ent (1900); Captain Binger's Du Niger au Golfe de Guinée (1892); W. Lunberte "Deads" W. Junker's Travels in Africa (Eng. trans., 3 vols. 1890-2).

Negros, isl. of Philippines, in Visayas group, between Panay on w. and Cebu on E. Area, 4,840 sq. m., the interior being a mountainous plateau. Mt. Malaspina (8.192 ft.) is an active volcano. Sugar-cane, tobacco, cacao, cotton, and grain are produced. Pop. (1901) 372,000.

Negruzzi, JAKOB (1843), Roumanian author, born at Jassy; in 1867 he founded the review Convorbiri Literare, and in 1880 was elected a member of the Academy. Chief Roumanian works: Mirona si Florica, Copii dupe natura, and the romance Mihail Vereanu. He has also translated Schiller's works into Roumanian.

Negundo, a genus of North American and Japanese trees belonging to the order Sapindaceæ. They bear pinnate leaves and small greenish flowers in spring. N. aceroides or N. fraxinifolium is a handsome North American species growing to about thirty feet or more in height. All species are hardy in Britain.

Negûs, an Abyssinian title corresponding to that of king. During the last two centuries it has been claimed by the rulers of Amhara, who have called themselves Negûs Negesti ('king of

kings').

Nehemiah was the colleague of Ezra in the work of reorganizing the Jewish state after the exile. As cup-bearer to Artax-erxes I. (Longimanus) at Susa, the capital of Elam, he gained his master's favour, and was commissioned to go to Jerusalem as governor (c. 444 B.C.). In face of much opposition from the surrounding tribes, he succeeded in restoring the walls of the city in a very short time; then returned to Babylon, but was again at Jerusalem in 433 B.C. Many abuses—laxity in offerings, desecration of the Sabbath, mixed marriages -had meanwhile sprung up, and Nehemiah without delay began a process of drastic reform. personal memoirs are partially preserved in the book bearing his name (cf. 1:1-7:5; 12:27-13:31). See for Book of Nehemiah under EZRA; also Rawlinson in Men of Bible.

Neilgherry. See Nilgiri.

Neilson, Julia (1868), English actress, made her debut in 1888, W. S. Gilbert's Pugmation and Galatea, at the Lyceum in London. She became the leading lady under Mr. Rutland Barrington at the St. James's, and sub-sequently acted with Mr. Beerbohm Tree. She achieved marked success in A Man's Shadow, The Dancing Girl, Hypatia, and Sweet Nell of Old Drury, but, above all, as Rosalind in As You Like It at the St. James's. She has also toured in the United States and Canada. She married

Mr. Fred Terry.
Neilson, Lilian Adelaide (1848-80), English actress, whose real name was Elizabeth Ann Brown, but who was also known by her stepfather's name of Bland. She ran away from home at fourteen, and made her first appearance in London in 1865 as Juliet. Her first triumph was in the character of Amy Robsart in 1870, and she subsequently achieved great success in Shakspearean parts. In America, which she visited in 1872, 1874, 1876, and 1879, she was most popular.

Neisse, tn., Prussian prov., Silesia, Germany, 32 m. s.w. of Oppeln, on river Neisse. Its oldest church is that of St. James (12th century). Trades in furniture, lace, wire netting, and machinery. Pop. (1900) 24,267.

Neith, or Nir, in Egyptian mythology the mother of the sun. She represented the deification of the female principle in nature. In Greek mythology she was identified with Pallas

Athene.

Nejd, or NEDJED, a region of Central Arabia, between El Hasa on E. and Hedjaz on W. It is a desert-girt plateau, some 204,000 sq. m. in area, traversed by hills and fertile valleys. Springs and wells are numerous, and the climate is healthful. It is the true home of the Arabs, and is celebrated for its horses and drome-daries. Pop. 717,000.

Nekrasov, NIKOLAI ALEXEIE-VITCH (1821-88), Russian poet, born in Podolia. His poems, including Russian Women, and For whom is Life worth Living in Russia? take high rank. The sufferings of Russia, especially of the proletariat, have stamped all his work with intense sadness.

Nelaton, Augustr (1807-73), French surgeon, born at Paris, where from 1851-67 he was professor of clinical surgery. A distinguished operator, he invented the probe bearing his name, which is much used in exploring wounds for hullets. His chief work is Eléments de Pathologie Chirurgi-

cale (ed. 1868-85).

Nellore, or Nellur, munic.
tn.. and cap. of Nellore dist.,

Madras, India, 96 m. N. of Madras. Pop. (1901) 32,040. The district has an area of 8,765 sq. m., and a population (1901) of 1,496,987. Nelson. (I.) Municipal bor., Lancashire, England, 3 m. N. E.

of Burnley. Cotton and other textiles are manufactured. Pop. (1901) 32,816. (2.) Provincial dist., South Island of New Zealand. Area, 10,175 sq. m. Full of rugged mountains and forests, its wealth consists in its mineralscoal, gold, iron, lead, silver, and copper ores. Fruit and hops are cultivated. Pop. (1901) 37,915. (3.) Capital of above, at head of Blind Bay, has jam factories. The mild climate is suitable for invalids. Pop. (1901) 7,009. (4.) Town, s.e. of British Columbia, Canada, on the Kootenay, 50 m. N.E. of Rossland, with silver-mining. Pop. (1901) 5,273. (5.) River, lower course of Saskatchewan, Canada, issues from N.E. corner of Lake Winnipeg, and flows N. and N.E. for over 500 m.

to Hudson Bay at Fort York.
Steamers ascend 90 m.
Nelson, Horatio, Viscount
(1758-1805), British admiral, Duke of Bronté in Sicily, was born at Burnham Thorpe, Norfolk, and entered the navy in 1770. He took part in a military expedition (1780) to seize the Spanish forts on the San Juan R. and on Lake Nicaragua. After the surrender of Toulon (1793), Nelson, disof Toulon (1793), Nelson, dispatched to Naples for troops, first made the acquaintance of Sir William Hamilton and his wife Emma; successfully engaged four French frigates on his way back; urged Hood to besiege Bastia in Corsica, which fell legged through Nelson's own fell largely through Nelson's own exertions (May 21, 1794), as did Calvi (August 10), where he lost the sight of his right eye (July 12). He next took part in an engagement with the Toulon fleet (March 12-14, 1795). In January 1796 Nelson joined Sir John Jervis. In face of the combined fleets of France and Spain, Jervis abandoned first Corsica, then Elba, for Gibraltar as a base. Nelson, sent to withdraw the Elba garrison, narrowly escaped capture by the Spanish. After that he took part in the battle of St. Vincent (1797). Against of St. Vincent (1797). Against orders, he hindered the divided Spanish fleet from rejoining, and captured the San Nicolus and the San Josef, and engaged the huge Santisima Trinidad. On July 24, 1797, Nelson failed, on a dark and stormy night, in an attack on Santa Cruz de Tenerife, and lost his right arm, the elbow being shattered by grape shot. But in April 1798 he rejoined St. Vincent before Toulon. Then, reinforced by Troubridge, and holding independent command. Nelson swept the Mediterranean in search of the French fleet, and found it at last (August 1) at anchor in Aboukir Bay. Equal in number of vessels, the French were superior in size, their flagship, L'Orient, being a first-rate of 120. The battle began at six in the evening, and lasted till late into the night. Nelson allowed only two battleships and two small frigates of his enemy to escape. The two battleships fell into his hands later on, and thus the whole Toulon fleet perished. Nelson, severely wounded in the forehead by scrap-iron, was created Baron Nelson of the Nile and of Burnham Thorpe. In 1799 the French took Naples, and Nelson conveyed the king and court to Palermo, returning to punish the rebels and hang Caracciolo, once an officer in the Neapolitan navy, for his treason. Then having been created Duke of Bronté (August 1799), he returned overland to England in the company

of the Hamiltons. In 1801, as second in command to Sir Hyde Parker, he sailed to crush the 'Armed Neutrality,' urging an attack on the Russian fleet at Reval; but his chief chose the alternative of an attack on Copenhagen. Nelson with twelve of the smaller ships, three of which grounded in the shallow channel, experienced in the Elephant his hardest fight, the battle raging from ten till half-past two, when a truce was made. For this Nelson was made viscount. Foiled in an attempt to carry off the boats of the Boulogne inva-sion flotilla (August 15), he spent eighteen months at Merton Hall, Surrey, with Sir William Hamil-ton. Thereafter he entered on the blockade of Toulon, living on board the Victory for nearly two years. On April 18, 1805, the Toulon fleet passed Gibraltar on Foiled in an attempt to carry off Toulon fleet passed Gibraltar on its way to the rendezvous at Martinique; but having been driven back by Sir Robert Calder, it finally anchored at Cadiz. When Villeneuve at length put to sea again (October 20), Nelson at-tacked him off Trafalgar (October 21). The English fleet attacked in two columns ahead, Nelson leading the northern or windward, and Collingwood the leeward or southern division. The Victory raked the Bucentaure with a terrible broad-side, which dismounted twenty guns, and killed or wounded four hundred men, and then became entangled in the rigging of the Redoutable, from whose mizzen-topa ball passed 'through Nelson's left epaulette, lungs, spine, and lodged in the muscles of his back,' and three hours later he died. His last words were. died. His last words were, 'Thank God, I have done my duty'—the duty England ex-pected him to do. Eighteen of the enemy's ships were taken or destroyed, most of the others being accounted for a few days later. He was buried in St. Paul's, London (Jan. 9, 1806). Trafalgar Square was begun 1829, and the column erected 1849, surmounted by a statue eighteen feet high by Baily. The lions were added by Landseer in 1867. The centenary of his death was marked by a great display of enthusiasm and feeling throughout Our Naval Heroes (ed. G. E. Marindin, 1901); Nelson's Letters to Lady Hamilton (1905); White and Muirhouse's Nelson and the 20th Century (1905); Laughton's Nelson and his Companions in Arms (1905).

Nelson, ROBERT (1656-1715), English religious writer, was born in London, and elected a fellow of the Royal Society in 1680, and was especially interested in the



Lord Nelson.
(Photo by Walker & Cockerell, from the painting by Lemuel Abbott.)

the empire. See Lives by Clarke and M'Arthur (1848); Southey (ed. 1904); Clark Russell, in Heroes of the Nations Series (1890); Browne (1891); Laughton, in Men of Action Series (ed. 1899); Mahan (1897); Beresford (1898); also Dispatches and Letters (ed. Nicolas, 1844-6); Letters and Dispatches (ed. Laughton, 1886); Nelson's Friendships, by Gamlin (1899); Lady Hamilton and Nelson, by Jeaffreson (1888);

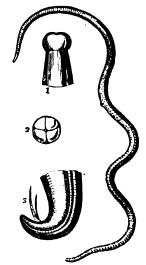
work of the S.P.C.K. and S.P.G., and in the establishment of charity schools. His sympathies were Jacobite, and he joined the non-jurors (c. 1694). Among his works are Transubstantiation contrary to Scripture (1687); Companion for the Festivals and Fasts of the Church of England (1704); and The Life of Dr. George Bull (1713). See Memoirs by C. F. Secretan (1860).

Nelumblum, a genus of aquatic plants belonging to the order Nymphæacea. They bear peltate leaves on the summits of long leaf-stalks, and beautiful cup-shaped flowers, also on long stalks. They can be easily grown under glass, or in sheltered districts in the open, if they are protected in winter. The roots should always be about a foot under water. N. speciosum is the sacred Egyptian bean of Pythagoras. It bears large, fragrant, very beautiful white flowers in summer.

Nemathelminthes, a phylum or series of the animal kingdom, erected to contain a number of wormlike forms, many of which are parasitical. The series includes the three following classes: (1) Nematoda; (2) Gordiacea, of which the most important member is Gordius; and (3) the Acanthocephala, including a number of small parasites, mostly found in aquatic vertebrates. All the Nemathelminthes are unsegmented, and among other peculiarities are characterized by the complete absence of cilia.

Nematodes, THREAD-WORMS, or ROUND WORMS constitute a somewhat isolated class of the animal kingdom. Frequently parasitic, the class as a whole exhibits some very peculiar adaptations to a parasitic, or at least a concealed, mode of life. The non-parasitic forms are to be found everywhere in rotting animal or vegetable matter, and can be recognized by their white colour, small size, and peculiar wriggling method of locomotion. The species of Ascaris are parasites of man and domestic animals; others are parasitic on plants, producing abnormal growths. A point of much interest is the virtual absence of pigment. The body is encased in a thick transparent cuticle, which gives the worms their characteristic stiffness in locomotion. This, doubtless, protects the parasitic forms from the action of the digestive juices of the host. The muscles of the body wall are histologically very peculiar, and consist of large cells, only the outer half of which seems to be contractile. The nervous system consists of a ring round the gullet, from which come off six nerves passing forwards and six passing backwards. No distinct ganglia are present, and sense organs are few. Between the body wall and the ali-mentary canal there is a very distinct space; but this is not homologous with the body cavity of other animals, for it is not lined internally by the middle layer (mesoderm). There are no respiratory and no circulatory organs. The mathod by which

the animals obtain the oxygen necessary for existence is obscure, but from experiments made it would appear that the respiratory interchange is exceedingly slow, for the worms will live for some



Nematode (A scar is lumbricoides).

1. Anterior extremity, side view: 2, front view; 3, posterior extremity.

days in an atmosphere quite free from oxygen. The alimentary canal is simple, for the food in most instances has been already elaborated by the host, and is in all cases largely fluid, if not entirely so. The mouth leads into a suctorial gullet, which opens into the intestine, or digestive region, which again opens into the rectum. The excretory organs consist of two long canals, embedded in the body wall, and opening to the exterior by a common pore placed in the anterior region. Almost all nematodes are uni-The male is usually smaller than the female, and has the posterior end of the body turned up. There is no disturned up. tinct larval stage, but in many cases the stimulus of a change of host is necessary before the animal becomes sexually mature. The classification is a matter of great difficulty, owing especially to the absence of any striking external features. Some of the more important parasitic forms will be found discussed under ASCARIS, FILARIA, TRICHINA. Of non-parasitic forms examples are the vinegar cels and the related forms, common in organic substances such as paste.

Nematus. See SAW-FLY. Nem. con. (nemine contradicente), 'no one contradicting;' unanimously. Nemea, place in Argolis in ancient Greece, the scene of Hercules's slaughter of the Nemean lion. In historical times it was famous for its temple and festival of Zeus, which was held every two years, under the presidency alternately of Cleona, Corinth, and Argos.

Nemertea, a group of unsegmented worms of much zoo-logical interest. The majority are marine animals, a few are fresh-water and a few terrestrial, while a few are parasitic, or more probably commensal, on molluscs. A common example is the purplish-black ribbon-worm, or sea-snake (Lineus marinus). This form may reach a length of many yards, but its bulk is not greater than the bootlace. A very characteristic structure is the proboscis, a slender thread, which may be shot out of a pore above the mouth, and is apparently both tactile and detensive. It is usually armed with a stylet. At the sides of the head are two slits convected with the two slits, connected with the brain, which have been regarded by some naturalists as a far-off prophecy of the vertebrate gillslits. Nemerteans display great irritability, and on very slight provocation will break in pieces or discharge the proboscis. Like echinoderms, they display great powers of regeneration. sexes are separate, and the lifehistory includes an interesting larval form The affinities of Nemertea are probably with Turbellaria.



Ribbon-worm, or Sea-snake.

Nemesia, a genus of South African herbaceous plants belonging to the order Scrophulariaceæ. They bear bright and pretty flowers of many colours, and are usually grown as hardy plants from spring-sown seed. They bloom in June and July.

Nemesis, in ancient Greek mythology, a goddess, the daughter of Night, or Erebus. She is really a personification of popular indignation against wanton crime. Later writers regard Nemesis as a deity who was jealous of excessive prosperity, and brought human pride low. She was particularly worshipped at Rhamnus in Attica.

Nemi, Lake, in Italy, among the Alban Hills, 20 m. s. of Rome; fills an extinct crater, and is 1,060 ft. above sea-level, 112 ft. deep, and 70 acres in extent. It lies E. of Lake Albano, and about 100 ft. higher. Ovid has celebrated its beauties in Met., xv. 487. On its margin was a famous grove to Diana, celebrated because its priest held office only until he was slain by his successor. J. G. Frazer, in The Golden Bough (new ed. 1900), has made this mysterious and hitherto unexplained rule the starting-point of a most suggestive treatise on primitive superstition and religion.

Nemophila, a genus of North American herbaceous plants (Hydrophyllacea) with blue or white flowers. They are hardy annual plants, and should be raised from seed in spring or autumn.

Nemours, LOUIS CHARLES PHILIPPE RAPHAEL D'ORLÉANS, DUC DE (1814-96), second son of Louis Philippe, was born in Paris. In 1831 he was elected king of the Belgians, and in 1832 king of Greece, but he refused both honours. From 1848 to 1870 he lived in England, and from 1870 to 1886 in France; after that in Belgium. See Bazain's Le Duc de Nemours (1903).

Nenagh, tn., Co. Tipperary, Ireland, 20 m. w.s.w. of Roscrea. Remains exist of a former castle of the Butlers. Pop. (1901) 4.704.

of the Butlers. Pop. (1901) 4,704. **Nennius** (fl. 796), supposed author of the Historia Britonum. Discrepancies in the dates given for the composition of the history (which, according to one of the prologues, was written in 858), and the fact that the work has evidently been frequently edited, render the whole question of authorship obscure, the only clear point being the ancient Welshorigin of the book. Written in Latin, it is chiefly valuable as the collection of legends from which the whole Arthurian cycle sprang. The Historia was first printed in 1691 in Scriptorcs Quindecim. See text (ed. J. Stevenson) issued by English Historical Society (1838), and by Mommson in Mon. Ger. Hist., vol. xiii. (1898); and Historia Britonum, by De la Borderie (1883).

Neodymium, Nd, 1436, a metallic element (sp. gr. 7, m.p. 840° c.) of the 'rare earths,' forming one of the components of didymium. It gives rise to pink salts with a characteristic ab-

sorption spectrum.

Neolithic. See STONE AGE.
Neon, Ne. 20, a gaseous element discovered (1898) by Sir
William Rumsuy, and present in
the atmosphere to the extent of
one or two parts per 100,000. It
is separated from argon, with
which it is mixed, by fractional
distillation of the liquefied gas,

and is itself a colourless gas that boils at -240°C., has a gas density of 10, is entirely chemically inactive, and probablymonatomic. Neon glows red-orange in a vacuum tube, and is marked by sprogred and green lines in its spectrum.

Neophyte, the name given to those recently admitted to the profession of some religious creed, or initiated into the practice of secret rites—c.g. the mysteries of Elcusis. In later times it was applied to those entering a religious order, as well as to young priests on their ordination.

Neo-Platonism, a system of Greek philosophy, originated in Alexandria in the 3rd century A.D. However far removed Plotinus, the real founder and chief representative of the school, may be from the Platonism of the Athenian philosopher, his system is one which, for loftiness of conception and fullness of elaboration, may rank with the great philosophics of the classical period. The principal aim of Plotinus was to give expression to the conception of that supreme unity which is the source of all existences and all know-While in Plato's system ledge. the supreme and all-determining factor, the Idea of the good, is still an idea, in the system of Plotinus the ultimate unity is raised above even the ideal world. From this two consequences follow. First, this Unity, or One, is inaccessible to knowledge, no matter how ideal. Hence, if man is to rise to the apprehension of God at all, it must be in some kind of intuition that transcends knowledge a state of ecstasy in which he is united with or absorbed into the divine Being. Secondly, the ultimate source of all existences cannot be identified with these existences, or regarded as immanent in them, without thereby losing its self-contained unity and independence. Hence it is necessary to find some conception which will account for the many, the inferior orders of existence, without detracting from their supreme source. Plotinus found the solution of his problem in the conception that the inferior orders are a sort of emanation or overflow from the divine fullness. first or highest emanation is reason (Nous), in which the ideas are contained; the second the soul (strictly the world-soul, of which particular souls are the differentiations). The soul is related, on the one hand, to the ideas, towards which it stands in a receptive attitude; on the other, to matter, in relation to which it is formative. Matter itself closes the scale at the lower end as mere privation or indeter-

minateness, devoid of real being, The soul and in itself evil. which thus on the downward side is immersed in matter, can only rise to its highest destiny by retracing the path in an upward direction and passing through successive stages of purification. From the sensuous life man must rise through the life of practical virtue to the contemplation of the ideas, and then at last he may attain to the state of ecstatic union with God. See Caird's Evolution of Theology in the Greek Philosophers, vol. ii. (1904); Whittaker's The Neo-Platonists (1901). The Neo-Platonic school continued during the 4th and 5th centuries - Porphyry, Iamblichus, and the Athenian philosopher Proclus being the most notable names, Neo-Platonism has been the root and source of all later philosophical mysticism. (See Mysticism.) Hypatia of Alexandria and Julian the Apostate were both in part pupils of this system of thought.

Neoptolemus, in ancient Greek legend, a son of Achilles. He was brought to Troy by Odysseus because oracles said he was destined to finish the war. He was one of the heroes in the wooden horse, and in the sack of Troy he killed Priam, and after the capture of the city sacrificed Polyxena to Achilles. The captive Andromache, wife of Hector, fell to his lot in the distribution of the spoil. Some accounts say that he afterwards reigned at Phthia in Thessaly, and married Menclaus's daughter, Hermione: others, that he was wrecked in Epirus, where his son by Andromache, Molossus, founded the dynasty of the Epirot kings. He is said to have been buried at Delphi, and was worshipped there

as a hero.

Neo-Pythagoreanism, a revival of Pythagoreanism in the 1st century A.D. The most notable name is that of Apollonius of Tyana, who in an extravagant romance of the 3rd century was represented as the ideal Pythagorean sage and endowed with miraculous gifts. God was conceived as wholly spiritual, while matter was the source of evil, from the contamination of which men must free themselves by ascetic practices.

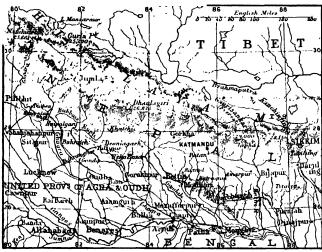
Neozoic, in geology, includes the Mesozoic (or Secondary) and Cainozoic (or Tertiary) systems.

Nepal, independent state, India, on s. slopes of Himalayas. Area, 54,000 sq. m. The chief rivers, which belong to the Ganges basin, are the Karnali and Sarju in w., the Gandak in centre, and the Kusi in E. Nepal is a densely-wooded, mountainous country, but is very fertile, and abounds in wild animals. The Tarai dis-

trict includes Mounts Everest and Dhaulagiri. Copper, iron, sulphur, and rock crystal are found. Chief exports, silk, cotton and woollen goods, tobacco, salt, sugar, and indigo. It trades with India and Tibet. The total exports (1904-5) were valued at £1,776,000, and the imports from

the government of India, and under a treaty, concluded at Segauli (Segowli) in 1815, a British resident resides at the capital, Katmandu. Pop. 4,000,000.

Nepenthes, a genus of tropical shrubs and sub-shrubs, bearing small greenish flowers and alternate leaves, the petiole winged at



Nepal.

India at £999,000. Manufactures coarse woollen cloth, brass and copper vessels. The people, called Ghurkas, are supposed to have originally come from Rajputana, and are of Mongoloid type. Hinduism is their religion; Buddhism



Nepenthes, or Pitcher Plant.

that of the aborigines. The climate is arctic, temperate, or tropical according to the altitude. There is a sovereign, but the real power rests with the prime minister. Internal disorder brought Nepal into conflict with

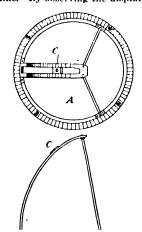
the base, the midrib prolonged at the top and curved or spirally twisted, terminating in a second foliaceous expansion, which is hollowed like an urn, to the opening of which is fitted a sort of lid, attached as by a hinge. From this curious formation the popular name of pitcher-plant is derived. There are about thirty species, all of fairly easy culture in the stove-house, a summer temperature of about 75° and a winter temperature of about 55° being required. The atmosphere must always be kept moist. The best compost is a mixture of two parts of peat to one part of sphagnum; and basket culture is the most suitable method of growing.

Nepeta, a genus of hardy herbaceous plants belonging to the order Labiatæ. They have flowers with a tubular five-toothed calyx, a two-lipped corolla, of which the upper lip is flat and notched, and the lower is three-lobed. The common ground-ivy, which bears rough crenate, heart-shaped leaves and bright purplish flowers, is N. ylechoma. Another British species, sometimes seen in hedgerows and on waste ground, is N. caturia, the catmint, which has an erect downy stem and leaves nearly white beneath, and bears dense whorls of small white flowers spotted with rose. Both species are strongly aromatic.

Nepheline, a silicate of aluminium and sodium, which crystallizes in small white hexagonal prisms (sp. gr. 2'6; h. = 6). It is common in lavas, but is not found in sedimentary or metamorphic rocks. In plutonic masses with granitic structure nepheline usually takes the form of cheolite, which has a dull, greasy lustre. Nepheline weathers readily, passing into natrolite, analcite, and other zeolites.

Nephelium, a genus of tropical evergreen trees belonging to the order Sapindacea. They bear pinnate leaves and many-flowered panieles of small flowers, followed by globose fruits. Two species are sometimes cultivated in the stove-house--the Chinese N. Litchi, which bears in May white flowers, followed by red and green berries containing a white, pleasantly sub-acid pulp; and the Indian longan (N. longana), which yields a yellow, smooth-skinned berry containing a tart white juicy pulp.

Nephoscope, an instrument used in observing the motion of clouds. One form consists of a horizontal circular mirror, with a concentric circle of azimuths and an eye-piece C, movable in a plane BD at right angles to the mirror, and also around it, through which the image of the cloud is brought to the centre of the mirror A. In use on land the instrument is placed with the zero of the graduated circle in some known direction, as the meridian, or in an east and west line. By observing the displace



Nephoscope: Plan and Elevation.

A, Mirror; c, eye-piece.

ment of the image in a given time the rate and direction at which the cloud is travelling can be calculated. An elaborate

series of observations with this instrument has been made since 1886 at Blue Hill Observatory, Boston, Massachusetts, U.S.A., which, in conjunction with somewhat similar work at Kew and Upsala, has yielded valuable data regarding the movement of currents at different heights in the atmosphere. See CLOUD.

Nephrite, or JADE, is a cal-

cium, magnesium, ferrous silicate. It is very hard (h.=6.5) and tough, and is usually dark green or pale green in colour, sometimes approaching white, and may be blotched, veined, or streaked. It has a specific gravity of 3, and when polished has a beautiful lustre. It consists essentially of finely fibrous hornblende, and the matted or felted and interwoven texture of the microscopic fibres is the cause of the great toughness. Damour (1863) pointed out the difference between it and jadeite. The latter, though entirely similar in appearance, is a sodium aluminium silicate, and is fusible. Objects of nephrite have been greatly valued by Oriental and American races. Pre-historic (Neolithic) settlements and tombs in Switzerland, Austria, Germany, and France have yielded enormous numbers. The principal sources of nephrite at the present day are Khotan (Turkestan), the Kuen-lun Mts., In-kutsk (Siberia), and New Zealand.

Nephritis, in medicine, the general term for various forms of inflammation of the kidney. Bright's disease is one form. Nephritis may arise from chill, is not uncommon as a sequel to **c**ertain fevers—e.g. scarlet fever and frequently results from longcontinued heart disease, with consequent backward pressure of blood in the kidneys, or the lodg-ing of an embolus in the kidney. Certain drugs-e.g. cantharides taken in excess will produce acute nephritis, which may end in death through suppression of the urine. This may happen even when cantharides is applied externally as a blister. In ne-phritis the urine is generally scanty, and dark in colour, throwing down a deposit when it cools, and containing albumin. Treatment depends upon the cause.

Nephrodium, a genus of ferns with sub-globose sori, arranged dorsally or terminally on the veinlets. Most of the species are of easy culture. Among the commonest is N. filix-mas, sometimes known as Lastrea filix-mas,

the male fern.

Nephrolepis, a genus of tropical ferns with simply pinnate fronds, the pinnæ being articu-In Britain lated at the base. they require stove temperature, thriving in a light peaty soil.

Nepigon. See NIPIGON.

Nepomuk, or Pomuk, John of. See JOHN, ST.

Nepos, Cornelius, a Roman historian, probably a native of Verona, was a friend and con-temporary of Cicero, Atticus, and Catullus. He wrote a collection of lives of famous persons, chiefly Greeks, of no great importance as a historical authority. but the excellent Latin and simplicity of style have made it a favourite school-book. Editions (text), Halm-Fleckeisen (1889); with notes) Browning and Inge (1888); Weidner-Schmidt (1890); Erbe (1892).

Neptune, the eighth and farthest known planet. Its exist-ence was predicted and its place assigned by Adams in 1845, and by Leverrier in 1846; and it was identified by Galle at Berlin, Sept. 23,1846, as a ninth-magnitude star, with a diameter of 30,000 miles Neptune being thus fifty-four times more bulky, though only than the earth. The period of rotation has not been directly determined. Dr. See detected



Relative Sizes of Earth (1) and Neptune (2).

at Washington, in October 1899, a set of faint parallel shadings on the planet's surface. Its spectrum, photographed at the Lowell Observatory in 1904, shows absorption by hydrogen and some unknown gases. Travelling round the sun at the rate of 31 miles a second, Neptune completes a revolution in 165 years. Its orbit being slightly eccentric (e=0.009), its mean distance of 2,800 million miles varies to the extent of 50 million miles: and the orbital plane is inclined 1° 47' to the ecliptic. Neptune's solitary satellite was discovered by Lassell (Oct. 10, 1846). It is a body about as large as our moon, and circulates in 5 days 21 min. 3 sec. in a sensibly circular orbit, with a radius of 221,000 miles, and an inclina-tion of 145° 12' to the plane of the ecliptic. Its movement is accordingly retrograde, or from east to west.

Neptune (Lat. Neptunus), in Roman mythology the god of the sea. He was identified with the Greek Poseidon. See Poseidon.

Nérac, tn., dep. Lot-et-Garonne, France, famous for its liver patés and its beer. Calvin,

Beza, and Clément Marot found asylum here. Pop. (1901) 6,435. Nerbudda. See NARBADA.

Nerchinsk, tn., Transbaikalia, Siberia, 180 m. r. of Chita. town was moved from the Shilka (34 m. to the south) to its present site in 1812. Pop. (1897) 6,713. Nerchinski Zavod, vil., Trans-

haikalia, Siberia, 186 m. s.e. of Nerchinsk, is the centre of a gold and silver mining district. Pop. 67,000, including convicts.

Nereids, in ancient Greek mythology, fifty nymphs of the sea, daughters of Nereus. Thetis, the mother of Achilles, was the most famous.

Nereis, a genus of chætopod worms, of which there are several British species. A common form is N. pelagica, to be found under stones on the shore. Another species (N. fucata) occurs in shells inhabited by hermit-crabs, an ex-

ample of commensalism.

Nercus, in Greek mythology, the son of Pontus and Grea, and father of the Nercids. He is the wise old man of the sea. The Mediterranean, and more particularly the Ægean Sea, was his special province. He hears the trident as the sign of his authority.

Nergal, Assyrian god of hunting and of warfare. The planet Mars was connected with him. He was represented at the gates of Babylonian temples by the figure of a winged lion with a

human head.

Neri, Filippo DE' (1515 95), Italian philanthropist, was born at Florence, and at Rome engaged in the relief of the poor, the instruction of children, and the reclamation of the fallen, founding an asylum for poor and sick strangers. He was the originator of the oratorios, or sacred musical entertainments, and founded (1558) a monastic order, the Fathers of the Oratory, with no perpetual vows, but simply charity as the only common bond. It obtained a strong following in Italy and France. Neri was canonized (1622) by Gregory XV. His Ricordi, or advice to youth, is well known. See Lives by Capecelatro (Eng. trans. 1882) and A. von Pechmann (1901), and L'Esprit de St. Philippe de Neri et son Ecole Ascé-tique, by L. B. (1900).

Nerine, a genus of S. African bulbous plants belonging to the order Amaryllidaceæ. They bear wide, loriform leaves, and umbels of gaily-coloured flowers. They are much cultivated as greenhouse plants in Britain, and require a light sandy soil containing plenty of leaf-mould. Propagation is usually effected by means of off-sets. The most valued species is N. sarniensis, the Guernsey lily. a tall-growing kind, with pale salmon-pink flowers.

Nerium, a genus of Asiatic and S. European shrubs belonging to the order Apocynaceæ. They bear narrow, coriaceous, evergreen leaves, and terminal racemose cymes of brightly coloured flowers. All parts of the plants are poisonous. They are grown as greenhouse or half-hardy plants in Britain. The most frequently cultivated species is N. oleander,

the common oleander.

Nernst, Walther (1864), German chemist, was born at Brissen in W. Prussia, and became assistant to Ostwald in Leipzig in 1887; was in 1891 appointed professor of physics in Göttingen, where in 1895 he organized the Institute for Physical and Electro-Chemistry. His principal work has been on the origin of the electric current and the theory of chemical equilibrium. His Theoretical Chemistry (1895) has been translated into English. He invented the Nernst electric lamp. See Electric Chemistry (1895) and the Mernst electric lamp.

Nero, a family of the Claudian clan at ancient Rome. (1.) GAIUS CLAUDIUS NERO, consul in 207 B.C., by his march from the south of Italy to join Livius in Umbria, enabled the Roman army to win the battle of the Metaurus over Hasdrubal, which practically decided the second Punic war. (2.) TIBERIUS CLAUDIUS NERO, who was the first husband of Livia, the wife of Augustus; they were divorced in 38 B.C. By Nero. divorced in 38 B.C. Livia had two sons, the emperor Tiberius and Drusus. (3.) Roman emperor (37 to 68 A.D.), was the son of Gnaus Domitius Ahenobarbus and Agrippina, the daughter of Germanicus. His original name was Lucius Domitius Ahenobarbus, but after his mother's marriage with the emperor Claudius, he was adopted by the latter (in 50 A.D.), and took the name of Nero Claudius Casar Drusus Germanicus. In 53 he married Octavia, the 53 he married Octavia, the daughter of Claudius and Messalina. His education was entrusted to Seneca, and Burrhus, the prefect of the pretorian guard. On Claudius's death, in 54, Agrippina managed to secure the proclamation of Nero as emperor, to the exclusion of Claudius's own son, Britannicus. Nero's folly was displayed in his absurd claims to excellence as a poet and a musician, which led him even to appear publicly in the theatre. His crimes began from his attempts to free himself from his mother's control. He had Britannicus poisoned in 55 A.D. In 59 Agrippina herself was murdered; in 62 his wife Octavia was first divorced, then put to death. This enabled Nero to marry Poppæa Sabina, with whom he had long had a connection; her, too, he killed in 65, in a fit

of passion. The chief events of his reign were the burning of Rome in 64 A.D., which has been said to have been the result of his orders, but this depends on no evidence. The blame was thrown by him on the Christians, many of whom were put to death. In 65 Calpurnius Piso formed a conspiracy against him, which was discovered; Piso, the poet Lucan, Seneca, and others lost their In 66 lives in consequence, Petronius, Soranus, and the Stoic Thrasea were put to death. In 68 Vindex, the governor of Gaul, rebelled, and was joined by Galba, the governor of one of the divisions of Spain. The pratorian troops at Rome then proclaimed Galba emperor. Nero, deserted, fled from Rome, and next day killed himself. Nero's personal appearance was coarse; his figure was bulky, and his face gress and brutal; the thickness of his neck was a marked feature. See B. Henderson's Nero (1904).

Nertera, a genus of creeping herbaceous plants belonging to the order Rubiacea. The only species cultivated in Britain is the charming little alpine plant, N. depressa, the so-called head plant. It bears small, coriaceous leaves, and tiny green flowers, and bright orange-red, berry-like fruit. The plant is easy of cultivation in the rock-garden, but some slight protection is desirable in winter.

Neruda, MADAME. See HALLÉ,

LADY.

Nerva, Marcus Cocceius (32-98 a.d.), emperor of Rome from 96 to 98 a.d.). He was consul under Vespasian in 71, and under Domitian in 90; on the assassination of the latter in 96 he was declared emperor by the senate and army, and his just administration restored tranquillity to the Roman world.

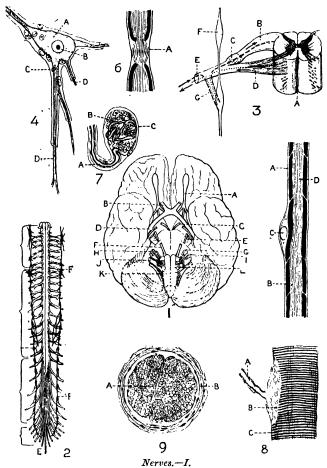
Nerval, GÉRARD DE (1808-55), the assumed name of Gérard Labrunie, French romantic author, born at Paris. The friend of Heine, the translator of Goethe. and one of the elect of literature, he paid for his power in a sad and restless life, and in a gathering gloon which ended in suicide. It is with this later phase of his life that he deals in Aurélie, ou le Rêve et la Vie (1855). Among his poems are Elégies nationaleset Satires politiques (1827). He wrote some plays; but more distinguished than these were his Contes et Facétics (1852), and La Bohème Galante (1855). Among his contributions to periodical literature was the dramatic feuilleton of La Presse, written in collaboration with Théophile Gautier. His Œuvres complètes appeared in 1868. See Cartier's Gérard de Nerval (1904); Gautier's Histoire du Romantisme

(4th ed. 1884), and article by A. Lang in Fraser's Magazine (May 1873).

Nervii, ancient Gallie tribe, belonging to the Belgie Gauls. Their territory extended from the river Sabis (the Sambre) to the sea, in modern Hainault. They were subdued by Julius Cesar in 57 B.C.

Nervous System. A primitive nervous mechanism might be represented by two cells connected with each other by a delicate filament of irritable protoplasmic material. In plants the functions of a nervous system seem to be served by prolongations of the protoplasm through the cell wall into adjacent cells. In a highly organized creature like man the nervous system includes the brain, the spinal cord, the nerves, and the end organs, as well as the various ganglia of the cerebro-spinal and the sympathetic systems. Each nerve is constituted of a collection of nerve bundles surrounded by a sheath of connective tissue. the perincurium; and the various bundles are bound together by bands of similar tissue, the epincurium. The individual fibres within each bundle are attached to one another by more delicate connective tissue, known as the endoneurium. Each fibre presents a central thread, called the axis cylinder, a fatty medullary sheath, and externally a primitive sheath. Of these three parts the axis cylinder is associated with the transmission of nervous energy, the medullary sheath is nutrient, while the primitive sheath supports and strengthens the more delicate parts within. Each fibre connects a central nerve cell with a peripheral end organ. Some nerve filaments terminate in muscular end plates, through which the stimulus for contraction is communicated to the muscle. Such fibres are called 'motor' or 'efferent,' since their nerve currents are carried outwards from the brain to the end plate. Many efferent fibres end in glands, and may be either secretory or inhibitory, while others terminate in subordinate nerve The end organs of such centres. nerve filaments are imperfectly known. Of afferent filaments the end organs may be the corpuscular bodies in the skin, which are connected with the sense of touch, or they may be the highly specialized cells of the retina, or those of the tongue, the nose, and the ear. Closely connected with, but to some extent distinct from, the cranial and spinal nerves is the subsidiary sympathetic system, whose special province is the nervous supply of the blood-vessels and the involuntary muscles. The leading characteristic of a nerve cell is its irritability; that

of a nerve fibre is its faculty of transmitting waves of nerve energy at the rate of about a hundred feet per second. In many ways this energy resembles electricity, although it is far from being identical with that force. The transmitted impressions are traction of the muscles. Many actions, however, are independent of consciousness. If acid be put upon the limb of a newly-killed frog from which the brain has been removed, the frog brings up the other foot, and brushes away the irritant. Such an act is 're-



correlated by the nerve centres, and from other centres in the cortex of the cerebral hemispheres impulses are dispatched along the motor nerves, and produce conflex.' The frog is dead, but its tissues are still alive. In the spinal cord are groups of cells called ganglionic centres, which make with the sensory and with the motor fibres a secondary nervous are between the sensory organs and the muscles. It is by means of these short nervous arcs that reflex action is possible. While they often demand most delicate co-ordination of various groups of muscles, reflex acts do not require intelligence or even consciousness. Reflex action becomes impossible if either the sensory or the motor nerve be severed, or if the ganglionic centre be destroyed. Reflex action, however, is not restricted to the spinal cord: part of the nervous are may lie in the subordinate parts of the brain. Many a pianist can play from the score, and at the same time conduct a conversation that fully occupies his mental powers. Man's preservation of an erect attitude is a reflex act demanding the harmonious co-operation of many groups of muscles; but it is effected without conscious effort. and it is often attained when the will is in abeyance and the conscious controlling faculties are asleep. The cardiac movements also are reflex, and are entirely independent of the will; while respiration furnishes an example of a reflex act which may be considerably modified by voluntary impulses. Thus ordinary breathing may at will be converted into deep or sighing respiration. On the other hand, a nerve current from higher centres may check or inhibit reflex action, and respiration may to some extent be arrested by an effort of will. Similarly the cardiac reflex may be arrested by stimulation of the cardio-inhibitory centre in the medulla, and the same result is attained if the lower end of a severed vagus nerve be stimulated by a strong electric current, in which case the heart stops because of irritation of the severed cardio-inhibitory fibres, which previously led from the cardio-inhibitory centre in the medulla oblongata to the heart. Nervous stimulation other than that of the will may produce similar results. Blushing, for example, is frequently due to the feeling of shame, which inhibits the reflex tonic contraction of the blood-vessels.

Every time nerves transmit a message they undergo partial destruction, and even when at rest they require nutriment. They are therefore supplied with bloodvessels, which ramify round them in microscopic networks, and with nervi nervorum, the nerves of the nerves. Each spinal nerve arises from two roots, an anterior and a posterior. Of these the anterior contains motor, and the posterior sensory fibres. On each posterior root is a ganglion, which exercises a trophic or nourishing influence on the sensory fibres. Similarly,

cells in the anterior cornu of the spinal cord have trophic functions for the motor filaments. The nature of trophic influence is obscure, but it is most probably effected by rhythmic waves of nerve energy proceeding outwards from the nerve centre. The brain and spinal cord are described in separatearticles. According to the simplest classification, twelve pairs of cranial nerves spring from the brain. The first pair are the olfactory, which are mere prolonga-tions of the brain forwards, and their filaments are distributed to the mucous membrane of the nos-The second pair are the optic or sight nerves. The third,

motor. The tenth pair are known as pneumogastric or vagi (wanderers), and they are distributed to the thoracic and abdominal organs. The eleventh pair contain motor filaments for the muscles of the neck, while the twelfth supply the muscles of the tongue. Of the spinal nerves thirty-one spring from each side of the cord. They are classified into eight cervical pairs, twelve dorsal, five lumbar, five sacral, and one coccygeal pair. Each spinal nerve has an anterior or motor root, and a larger posterior and sensory root, with a ganglion upon it. The two roots coalesce, and many of the spinal nerves tercommunication exists between the sympathetic and cerebrospinal systems, and many of the sympathetic fibres are ultimately derived from cranial and spinal nerves and centres.

Diseases of Nerves. - Nerves, like other tissues, may be cut, torn, bruised, and sometimes considerable portions of them are removed at surgical operations. Again, a nerve may be affected by a bony fracture or by the pressure of a tumour of a neighbouring tissue. Damage to a purely motor nerve produces loss of muscular power as well as muscular wasting. An injury to a sensory nerve may be followed by diminu-

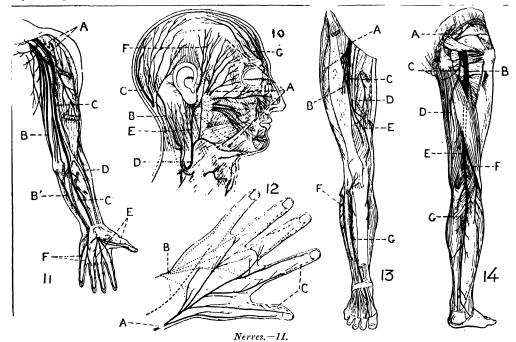


Fig. 10. A, Branches of the seventh or facial nerve; B, the small occipital nerve; C, the large occipital nerve; n, superficial cervical nerve; E, great auricular nerve; F, auriculo-temporal nerve; a, super-orbital nerve. Fig. 11. Nerves of the left arm, front view: A, external and internal anterior themsel; B, thumar; C, chemidial; E, branches of incidian; F, hanches of ulnar; Fig. 12. Cutaneous nerves of lack of hand: A, radial nerves: B, dowad branch of ulnar; C, branches of median nerve. Fig. 13. Nerves of the leg, front view: A, anterior crund; s, middle cutaneous; C, internal cutaneous; C, sternal cutaneous; C, internal cutaneous; C, internal cutaneous; C, small sciatic; D, descending cutaneous; E, internal popiliteal; F, external popiliteal; C, obstrict vibial.

fourth, and sixth pairs are distributed to the muscles of the eye, and, being motor, they con-trol the movements of the eyeballs. Each of the fifth pair of nerves is very large, and has three great branches. They are partly sensory and partly motor, and are distributed to the skin and muscles of the face as well as to part of the tongue. The seventh pair comprise the facial nerves. The eighth are the auditory or ear nerves. The ninth are partly concerned with taste and partly

unite at some distance from the cord to form a network or plexus.

The sympathetic system of nerves forms a double chain of ganglia, one on each side, or slightly in front, of the spinal column. These ganglia communicate with each other and with the spinal nerves by delicate commissural threads. Nerves arise from the ganglia, and are distributed chiefly along the blood-vessels. They also form considerable plexuses about the thoracic and abdominal viscera. Free intion or loss of sensation. Again a paræsthesia, such as numbness, burning, cold, or tingling, may result, or an alteration in a special sense, such as singing in the ears, or constant unpleasant odour in the nostrils. After simple section, nerves readily unite should the cut ends be kept in apposition, and generally massage of the muscles and faradization suffice to maintain tone and nutrition till the injury is repaired. Tumours of nerves are known as neuromata. They are often mul-

tiple, and are frequently due to a constitutional cause, such as syphilis. They are generally attended by great pain; but when they occur on a nerve of special sense, they may cause loss of that sense. A form of neuroma known as traumatic is frequently found at the end of a cut nerve, to which it gives a bulbous appearance. In some cases the tumour may be dissected out; in others it is better to cut away a few inches of the ailing nerve. While anæmia and cachectic conditions tend to produce degeneration of the nerve fibres, the most grave degenerative changes are those which follow the severance of a fibre from its trophic centre. this case fatty degeneration speedily ensues, and the axial cylinder breaks up and disap-pears. See separate articles for neuralgia and neuritis.

Nesfield, WILLIAM EDEN (1835–88), English architect, born at Bath; was the designer of Farnham royal church, and Cloverly Hall, Shropshire. He was also an authority on articles of vertu of all kinds, and a successful designer of furniture. In 1862 he published Specimens of Mediewal Architecture, French and Italian, of the 12th and 13th centuries.

Ness, LOCH, one of a chain of lochs in the Great Glen, Inverness-shire, Scotland. It extends 22½ m. in a s.s.w. direction, and has an average breadth of 1 m. The depth is from 106 to 130 fathoms. It is bordered by wooded hills rising to 2,000 ft. From the E. it receives the Foyers, the falls of which produce electric power for aluminium works. The s. end communicates by the Oich R. and part of the Caledonian Canal with Loch Oich; the N. end by another part of the canal and the Ness R. with Moray Firth.

Nesselrode, Karl Robert Count (1780 - 1862), Russian statesman, of German descent, born at Lisbon; took a prominent part in the negotiations preceding the peace of Paris (1814) and in the congress of Vienna. In 1816 he became minister of foreign affairs, and for forty years he did much to influence the fortunes of Europe. He was a supporter of the Holy Alliance. His policy was mainly one of peace. After signing the peace of Paris (1856) he was succeeded by Prince Gortschakov. See his Selbstbiographie (1866), and his Lettres et Papiers, ed. by A. de Nesselrode (1904).

Nessier's Reagent, a solution of mercuric iodide in potassium iodide solution in the presence of excess of caustic potash. It is a most delicate test for ammonia; a distinct yellow colour is produced when the reagent is added to 100 c.c. of a solution containing

as little as one part of ammonia in one hundred million parts of water.

Nessus. See Hercules. Nestor, a genus of New Zealand parrots, of which one species, N. meridionalis, is called kaka by the natives, and the other, N. notabilis, which inhabits the South Island only, kea. kaka inhabits woods, and feeds on soft fruits, nectar, and insects. The kea, on the other hand, haunts rocky mountains, at elevations where vegetation is scanty. Its natural food appears to be chiefly insects; but it has been accused of carnivorous propensities, and has been said to attack living sheep, tearing through skin and flesh until it reaches the fat about the kidneys, which it greatly prizes. This charge, however, has not been satisfactorily proved.



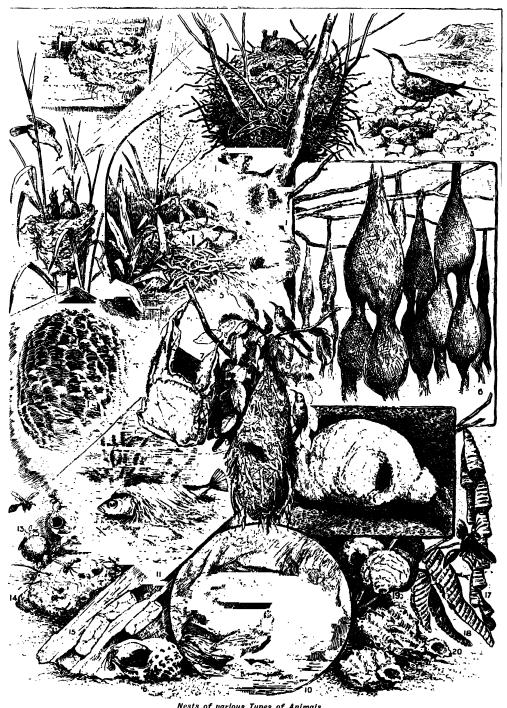
Nestor, in early Greek legend, one of the twelve sons of Neleus, king of Pylos, and the only one left alive by Hercules when he captured Pylos. Nestor took part in the war of the Lapithæ against the Centaurs, the hunt of the Calydonian boar, and the Argonautic expedition. In the Hiad and Odyssey he appears as the typical old man, in his wisdom, his garrulity, and his admiration of the past.

Nestorians, a heretical party in the 5th century, who drew so wide a distinction between the two natures of Jesus Christ as to imply a twofold personality. Nestorius, who gave the sect its name, was made patriarch of Constantinople in 428. Having come under the influence of Theodore of Mopsuestia and the Antiochene school, he held that the Virgin Mary was the mother of Christ only on His human side. This was not only contrary to the general dogmatic standpoint of the time, but was especially a challenge to the increasing reverence paid to the Virgin; and Cyril of Alexandria entered the lists against Nestorius, a bitter controversy ensuing. The Emcontroversy ensuing. The Emperor Theodosius II. summoned a general council at Ephesus in 431 A.D., and Nestorius and his party were condemned before they arrived. A few days later,

however, they held an opposition council under the presidency of John of Antioch, and excommunicated Cyril. Terms of accommodation between the two parties were eventually found in the Antiochene confession, drawn up by Theodoret in 433; but Nes-torius himself was banished (435). Other irreconcilables took refuge in Persia, India, China; but they did not succeed as missionaries. The so-called 'Nestorians' of Turkish and Persian Kurdistan deny all connection with the heresiarch, and call themselves Kaldani, claiming descent from the ancient Chaldmans. They the ancient Chaldmans. are Christians, and the term Nestorian applied to them may be a corrupt form of Nessaráni. a common word for Christian in 200,000. In Malabar there are some 100,000 'Syrian Christians,' probably descendants of early

Nestorian refugees.

Nests. The habit of nestbuilding is best developed in birds. Yet many birds do not make nests; some, like many sea birds, lay their eggs on the bare ground, and others merely collect together a rough heap of material so as to shelter slightly the sitting hen. Again, the harvest-mouse and the squirrel among mammals, the sticklebacks among fishes, ants, bees, and wasps among in-sects, all build nests. Among birds the instinct is best developed among the passerine forms; and the weavers, tailorbirds, and humming - birds all construct nests of special beauty and complexity. As a general rule, in birds the character, material, and situation of the nest show great constancy for the species, though some birds do not hesitate to appropriate the nest of another species-the common sparrow, for instance, being said often to oust the lawful owner for this purpose, while other birds show a great range of variation in regard to the situation and material of the nest. birds the object of the nest is merely to serve as a convenient place for incubation; but among other animals the nest frequently serves, in addition, as a habita-tion. In such cases the nest tends to become overrun with vermin-as are usually, indeed, the beautiful nests of birds. The more intelligent forms, like the apes, seem to get over this difficulty by frequently abandoning the old habitation for a new one. It is perhaps in part this diffi-culty which leads the squirrel to construct two nests -- a summer one, in which the young are reared, and a winter one, where hibernation is carried on. See J. G. Wood's Homes without Hands (1865).



Nests of various Types of Animals.

1. Squirrel. 2. Swallow. 3. Common tern. 4. Reed wabler, 5. Coot. 6. Indian weaver-bird. 7. Tailor-bird. 8. Philippine scarlet bird. 6. Oven bird. 10. Dipper, 11. Stickleback. 12. Hornet. 13. Emmens coaretata, 14. Pelopeus madraspatanus. 15. Megachile Willough birdl. 15. Osmit aurudenta. 17. Polistes atterimus. 18. Icarla. 19. Eumenes xanthins. 20. Ichnogaster

Net, any fabric composed of either unimal, vegetable, or (as in the case of asbestos) mineral fibre, wherein the threads are so twisted or plaited, looped or knotted together, as to intersect one another at regular intervals. Thus, net means any open-work fabric in which the knots or intersections alternate with each other, irrespective of the size or shape of the meshes or holes.

shape of the meshes or holes.

Fishing Net.—A knotted net
for use in the fishing industry,
principally made by hand. Fish
Net.—A rather coarse lace net of
either wool, cotton, silk, or flax,

Mosquito Net.—A machine-made Brussels net of medium quality, largely used in tropical countries. Point d'Esprit.—A fine meshed net, with small square dots or spots regularly distributed, used for millinery purposes. Tulle.—A fine meshed net, first made by hand at the town of that name. To-day, any gauzy or filmy net, silk for choice, such as mechline, is called tulle. Illus n.—Similar or the same as tulle.

Netherlands, KINGDOM OF THE, known generally as HOL-LAND, lies between the North Sea and the Prussian provinces of

THE NETHERLANDS SHOWING DEPRESSIONS. English Miles 30 Ameland Ter Schelling Emden Depressions Vileland Leeuwarden below sea level Groningen Texel De Helder NORTH SEA ZUYDER 4, <u>m</u>il Zwolle Haarle eyden THE HAQUE Zutpheh rnhem H.ag Goeree Bois-le-D SSIA 0 GHENT COLOGNE B E OBRUSEBLE

used as a trimming. Mosaic Net (sometimes called random net and crazy net).—A novel arrangement of irregular meshes simulating the lines in mosaic inlaying. (See illustration of lace manufacture, p. 3652). All the above, except fishing net, are made upon Nottingham twist-lace machinery, and most of them, if special elasticity is required, upon Nottingham warp-lace machinery. Mechline, or Malines.—This net, when first made upon the machine, was commonly known as fender net, owing to its resemblance to the wire net used in the old brass fenders.

Hanover and Westphalia, with Belgium on the s. From N.E. to s.W. it measures 210 m., the narrowest part from E. to w. only 30 m. The parts of the country in which the population are most densely concentrated lie next to the North Sea, between the deltas of the Rhine (e.g. the lissel, Waal, Crooked Rhine, Vecht, Lek, and Old Rhine), the Maas, and the Scheldt. In these districts, and also along the N. coast, the surface lies for the most part below the level of the North Sea, most of it more than eight feet lower. The rivers, con-

fined between high earthen banks, flow several feet above the surrounding country. Against the sea Holland is protected partly by natural sand-dunes, partly by artificial embankments or dikes. Nevertheless it is estimated that the sea has, within the historic ages, engulfed some 1,442,000 acres of the surface of Holland. A great part of this area is now covered by the Zuider Zee (South Lake or Sea), and a great part by the Wadden (Shallows), which on the N. and N.W. separate the mainland from the chain of (Frisian) islands (Texel, Vlieland, Terschelling, Ameland, Schiermonnikoog, Rottum, and Borkum) that mark the outline of the ancient continental coastline. Within the historic epoch it is estimated that the w. coast-line (provs. N. and S. Hollard) has receded 7 in, to the E. equivalent to the loss of 372,000 acres. But in the 16th and 17th centuries over 59,000 acres were recovered in the two provinces named; while in the Dollart (an expansion of the Ems estuary) some 65,000 acres were reclaimed between 1545 and 1877. In the 19th century, again, 42,000 acres were gained in 1818-52 by the drainage of the Haarlem Lake, s.w. of Amsterdam; and over 21,000 acres by the drainage of the Ij basin between 1870 and 1880. Since the 16th century more than a million acres have been won from sea, lake, and river, and the recovery of the s. part of the Zuider Zee is now in contemplation.

From a maximum elevation of 655 ft. in the extreme s.E. corner the surface slopes uniformly N.W. until it sinks to 20 ft. below sea-level. The alluvium (59 per cent. of area) consists of fens, clays, and sands. The most fertile districts are the clays, especially in the newly reclaimed polders -i.e. low-lying basins which have been first embanked and then pumped dry. The diluvial strata (40) per cent.) consist chiefly of sands and gravels, and are not relatively of very high fertility. Besides the (Frisian) islands of the N. coast, and some small ones in the Zuider Zee, several larger ones viz. Over Flakke, Goeree, Lisselmonde, Schouwen, Tholen, N. and S. Beveland, Walcheren, Voorne, and Biesbosch-fill the estuary of the Maas and Scheldt. The canals and waterways of Holland far surpass in importance both the railways and the metalled roads. They approximate afted roads. They approximate 5,000 m. in length, whereas the railways in 1904 had a length of 1,817 m., of which the state owned 985 m. The climate resembles that of England, but is more variable. In the height of summer the low maritime provinces are apt to be unhealthy for

other than the native-born inhabitants. Pop. (1899) 5, 104, 137. The inhabitants are descendants of the ancient Frisians in the N., of the Franks in the middle, and of the Saxons in the s.; but the purity of their blood has been to some extent modified by admixture with French Huguenots, Walloons, Scotsmen, and others. There are 104,000 Jews, mostly at Amsterdam. The majority of the people belong to the Reformed Church, which is governed by one general and ten provincial synods. The Roman Catholics have one archbishop (Utrecht) and four bishops (Haarlem, 'sHertogenbosch, Breda, and Roermonde). Jansenists have one archbishop (Utrecht) and two bishops (Haarlem and Deventer). Since 1900 education has been universally compulsory. There are a poly-technic at Delft, a state school at Leyden, the Institution for the Languages and Peoples of the E. Indies at Delft—all on a semi-university footing. There are four universities (Amsterdam, Groningen, Leyden, and Utrecht).

Apart from brewing and distilling, the manufacture of sugar, vinegar, bricks, and stoneware, margarine, machinery, cocoa, salt, some textiles, glass, and paper, diamond-cutting, and shipbuilding, the industries are not of special importance; there are no mining industries. The real economic interest of the Netherlands centres in her grazing and agriculture. cattle are of superior breeds, and both butter and cheese (Gouda, Edam), now made in factories after the Danish model, are exported. Gardening, especially the production of bulbs, flowers, and fruit, has been carried on for centuries. The fisherics are of some importance. The Netherlands constitute a free-trade country. A few duties are levied, but they have only a fiscal, not a protectionist character. The imports were valued in 1904 at 201 millions sterling, the exports at 165 millions; they consist principally of cereals and flour, iron and steel, textiles, copper, sugar, margarine, timber, vegetables, skins, coffee, rice, butter, cheese, tin, and flax. The chief ports are Amsterdam, Rotterdam, and Flushing.

The Netherlands form a constitutional and hereditary monarchy. The States-general consist of two houses—(1) the upper or first chamber, embracing fifty members, elected for three years by the provincial councils; and (2) the second chamber, embracing a hundred deputies, elected every four years by practically universal suffrage. Habitual drunkards, vagabonds, and vagrants are cared for in state 'colonies' (agricultural).

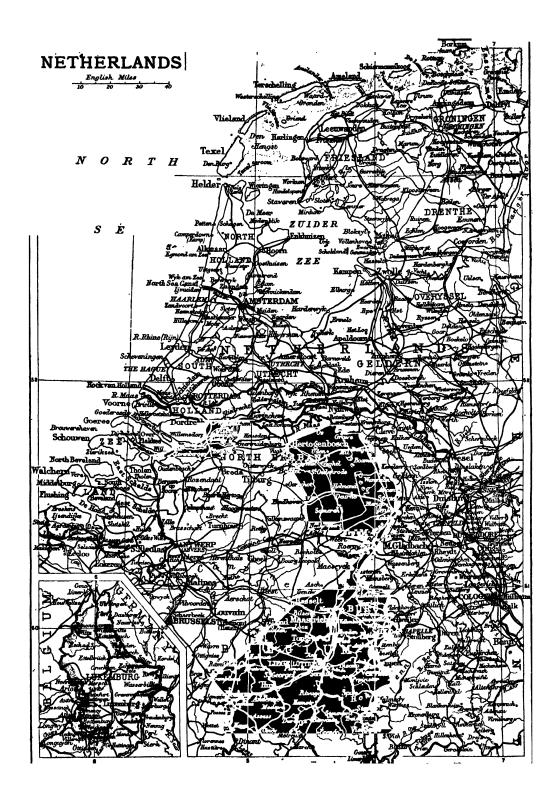
The army on a war footing consists of about 80,000 of all ranks, and the navy is made up of 9 battleships, 8 cruisers, and some coast defence vessels.

The Netherlands still remain a considerable colonial power. The Dutch colonies may be divided into two groups: (1) Dutch E. Indies (area, 736,400 sq. m.; pop. 36,000,000); (2) Dutch W. Indies (area, 46,463 sq. m.; pop. 122,269).

(area, 46, 463 sq. m; pop. 122, 269).
See H. Blink's Nederland en zine Bewoners (1888), of which the same author's Tegenwoordige Staat van Nederland (1897) may be considered a later summary; D. S. Meldrum's Holland and the Hollanders (1899); and La Hollande (1900), by F. Bernard and

others. History.-The low lands about the mouths of the Scheldt, Maas, and Rhine were inhabited in the 1st century A.D. by Celts and Germans. The Batavi (German) Germans. The Batavi (German) supplied the Roman armies with a body of cavalry, and revolted against them under Claudius Civilis (70 A.D.). After the fall of Roman rule (c. 400 A.D.) Frisians still occupied the N. and W. coasts, while Franks settled in the districts S. of the Rhine, later displacing or min-gling with the Frisians, and Saxons occupied the interior behind the present Zuider Zee. Local dialects indicate traces of this distribution, which, however, was much modified by migration and colonization. On the division of Charles the Great's dominions (843), the Netherlands became part of Lotharingia, the borderland between Germany and Gaul, which from 879 onward was associated with the German kingdom. The feudal system never took root in Friesland, but split up the remaining districts into small semi-independent states (duchies, counties, bishoprics), which were grouped together by the marriage of the lords, or by inheritance, during the 13th and 14th centuries. During the 15th century the groups were gradually united in the same way under the dukes of Burgundy. When Charles the Bold died (1477) the territory passed to his son-in-law, Maximilian of Austria, and became part of the 'Circle of Burgundy.' Philip the Fair, son of Maximilian, linked the Netherlands with Spain by marriage; and Philip's son, Charles v., the future emperor, was born at Ghent. As his subjects, the Dutch could trade throughout his vast dominions, and thus in the same way under the dukes of Burgundy. When Charles the his vast dominions, and thus began their world wide commerce. Seventeen provinces were grouped together under him: Brabant, Limburg, Luxemburg, Gelderland, Flanders, Artois, Hainault (Hennegau), Holland, Hainault (Hennegau), Holland, Zeeland, Namur, Friesland, Rys-

sel (Lille), with French Flanders, Doornijk (Tournai), Utrecht, Malines (Mechlin), Overijssel with Drenthe, Groningen; and the combination was confirmed by the Pragmatic Sanction of 1549. For the southern provinces, at any rate, his reign was a golden age. On his abdication (1555) the Netherlands passed to his son, Philip II. of Spain, afterwards husband of Queen Mary of England. During the latter part of his reign Charles took measures to check the spread of the reformed doctrines in this part of his dominions; but after the accession of Philip II. the matter was taken in hand with greater energy, and the most vigorous efforts were made to repress the heretics. The numbers executed have been variously estimated at from 50,000 to 100,000. Nevertheless they increased in numbers. Philip, on his departure for Spain in 1559, left his halfsister Margaret, Duchess of Parma, as regent of the Netherlands. Her choice of a foreign ecclesiastic (Granvelle) as her adviser, the continued presence of the Spanish garrisons, and the persecutions, estranged alike the people and the nobles; the latter, after vainly appealing to the duchess, founded the party of the 'Gueux,' or Beggars (1566). Prominent among the petitioners were Prince William of Orange and Counts Egmont and Hoorn. A violent anti-Catholic movement arose; images of saints were broken and the cathedrals damaged. The moderate inhabitants were scared. Counts Egmont and Hoorn were arrested and executed (1568). The Duke of Alva, with 17,000 Spanish troops, took hideous vengeance on the revolters, William of Orange vainly directing the resistance against him. But Alva, by proposing new and paralyzing taxes, raised the whole people against his rule; and the occupation (1572) of Briel by the 'Gueux de Mer' (Protestant patriots), followed by that of Flushing and Enkhuizen, nerved the Protestants to fresh efforts. Many towns revolted; and on July 18, 1572, by the league of Dordrecht, William of Orange (William the Silent) was proclaimed stad-houder, statthalter, or governor, in lieu of the Duke of Alva, over the provinces of Holland, Zeeland, and Utrecht, and leader of the defensive league. In September his army was routed be-fore Mons; Haarlem fell after a glorious siege; Leyden saved itself by cutting the dikes; but the successful defence of Alkmaar and a Spanish naval defeat on the Zuider Zee led to Alva's recall. Of the struggle under the succeeding governors, the



chief events are the gradual rally of the south to Roman Catholicism under the Prince of Parma in 1579 - 81, the deposition of Philip II. and appointment of William the Silent as sovereign prince (statthalter) in Holland and Zeeland (1581), William's murder (1584), and the futile English intervention under the Earl of Leicester. The defeat of the Spanish armada, however, by the English seamen of Elizabeth (1588) enabled John van Olden-barneveldt and William's young son Prince Maurice to make headway against the Roman Catholics; and after a long struggle a twelveyears' truce was concluded (1609). The provinces had meanwhile been ceded to Isabella, Philip's daughter, and Archduchess of Austria. Many refugees now came in from the hitherto more cultured southern provinces, and the next eighty years were the most brilliant in Dutch intellectual life. The East India Company was founded by Oldenbarneveldt in 1602. Trade with the Indians at what is now New York was opened in 1610, and a settle-ment made in 1624. Settlements were also made in Java, and the rivalry with the English found expression in the massacre of Amboyna (1623). Ceylon was cleared of the Portuguese in 1658, and settlements were made in the West Indies and Brazil. Navi-gators like Willem Barents, Linschoten, and Le Maire explored alike the Arctic seas and the far South. The provinces differed in character, and were 'republics rather than a republic.' sent delegates to the States-general at the Hague; but each state had but one vote, and for important decisions unanimity was requsite. There was a Council of State, in which the representation was less unequal, and the members of which voted individually. The statthalter individually. The statthalter was technically statthalter in only one or more provinces, never (till 1747) in all at once; but he was de facto president of the confederation, controlled its army and navy, and had two votes in the council. Dependencies of various kinds—e.g. lands acquired from the Roman Catholic southhad no representation. The history of the years 1609-1747 is largely concerned with the conflict of the monarchical and republican elements in the constitution, Holland and its pensionary representing the latter. Before 1609 the Calvinist and Remon-strant theological controversy had begun between Gomarus and Arminius, professors at Leyden University (founded 1575). Maurice and Oldenbarneveldt, already at variance, took opposite sides. The Gomarists triumphed, and

Oldenbarneveldt was executed, and the great jurist Hugo Grotius sentenced to imprisonment for life. The war with Spain, renewed in 1621, ended in 1648, Spain by the peace of Westphalia recognizing the independence of the United Provinces and their conquests in the Far East. Prince Maurice was succeeded (1625) by his brother, Frederick Henry, who insisted on religious peace, but made no effort to increase his powers. His son, William II. (1647-50), tried to do so, but was foiled. During the long minority of his posthumous son, William III., afterwards king of England, the power rested with Holland and its pensionary, John de Witt. The wars with England, due to commercial rivalry (1652-4, 1664-67), were indecisive; in the latter the Dutch fleet came up the Medway and threatened London. The Triple Alliance (1668) turned Louis XIV. against the Dutch, who were assailed by England and France in 1672. The French in-vasion roused the populace to murder De Witt; the Perpetual Edict of 1667, which excluded the Orange family from the statthaltership of Holland and Zeeland, was repealed, and William III. became statthalter in five provinces. The peace of Nimeguen (1678) closed the war. The Dutch were parties to the Grand Alliance (1679), and joined in the wars of William III. and the Spanish succession, but gained little by either; and the consequent heavy taxation, especially customs and excise duties, falling heavily on the necessaries of life and on raw material, combined, with their adoption of the 'mercantile system,' to cripple their industries. The growth of navigation lost them their entrepôt trade, and the cessation of religious warfare brought in greater nations as competitors. Hence they declined throughout the 18th century. The Belgian provinces passed, at the peace of Rastatt (1714), to the house of Austria. After William III.'s death, without issue, in 1702, the republican or oligarchical element ruled till 1747, when the French invasion caused their overthrow, and the election of William Henry (William IV.), posthumous son of John William, Prince of Orange and statthalter of Friesland, as hereditary statthalter of all seven provinces. He died in 1757, his son, William V., coming of age in 1766. In the American revolution the provinces joined the armed neutrality; Great Britain attacked them, and their disasters caused the deposition of William v. by the 'patriot party' (1786). He was restored by Prussia, who guaranteed his rule jointly with Great Britain. The French re-

public, therefore, was aided by the patriots to overthrow his government and set up the Batavian republic (1795). This was remodelled, not without violence, This was rein 1798 and 1805; but its repeated failures to respond to Napoleon's demands for money and men caused him to set up his brother Louis Bonaparte (father of Napoleon III.) as king in 1806. He, however, regarded the needs of his subjects more than those of his brother, who forced him to abdicate in 1810, and united the country with France. An anti-French revolution in 1813 set up William of Orange, son of William v., for whom the Congress of Vienna created the kingdom of the Netherlands (the United Provinces and, approximately, modern Belgium) especially to serve as a check on France. The severance of 1830 (see Belgium) was made permanent by the intervention of England and France. King William I. abdi-cated in 1840. William II., his son, granted a new and more parliamentary constitution in 1848. During the reigns of William III. (1849 90) and his daughter Wilhelmina (the present queen, who came to the throne in 1890) the chief political problems have been (1) colonial. (2) financial, and (3) internal reforms. (1.) A system of forced native labour, revived and extended by the governor of Java in 1830, and profitable but oppressive, was suppressed after a prolonged struggle in 1870. Slavery in the American colonies was abolished in 1863. In 1872 the colonies in Guinea were ceded to Great Britain, the Dutch in return Sunatra. A long and exhausting war with the sultan of Acheen (Atchin) followed (1873-79), entailing heavy deficits. It was resumed, but in a less severe form, in 1895. (2.) The strain of these wars, and the example of other countries, led to a protectionist movement, which was checked at the general election of 1905. An income tax was established in 1902. (3.) A bitter conflict over denominational versus secular education (acute in 1857, 1878, 1889, and 1895) is at present suspended. Conscription, with power to purchase substitutes, replaced voluntary enlistment in 1861. Personal military service was established in 1898, the Roman Catholics being its chief opponents. The franchise, after the question had shattered the Liberal party, was extended in 1896; a further eventual extension is contemplated (1906). It is opposed largely through fear of socialism, which became active about 1886. The succession to the throne was rearranged after the

demise of the heir-apparent (1879). Queen Wilhelmina (1880) married Prince Henry of Mecklonburg-Schwerin in 1901, and has not as yet issue. Failing direct issue, the throne passes to the descendants of Sophia, Grand-duchess of Saxe-Weimar, sister of William III. The heir - presumptive, Prince Henry XXXII. of Reuss (younger line), is a son of her daughter, the Duke of Saxe-Weimar being disqualified. See P. J. Blok's History of the People of the Netherlands (Eng. trans. of vols. i. and ii. 1898-9; in Dutch, 6 vols. 1892-1904); Motley's Rise of the Dutch Republic (3 vols. 1858), and History of the United Netherlands (4 vols. 1869); J. E. T. Rogers's Holland, in Stories of the Nations Series (1886).

Language.— Dutch (medieval Dietsch or Duuitsch, now Nederlandsch officially) arises from three Low German dialects, being mainly West Frankish, with some Frisian and less Saxon admixtures. Dietsch is written in erary Flemish, used in Northern Belgium and part of France, is almost identical with Dutch.

Literature - The earliest (including Flemish) consists mainly of translations from Romance sources by Jakob van Maerlant (13th century) and others. The improved version of the French poem of Reynard the Fox, by a Flemish poet (Willem, c. 1250), was the basis of the later versions. In the 14th century Jan Boendale wrote rhymed chronicles and didactic poems, and wandering minstrels (sprekers) Potter (d. 1428) wrote a long poem, Der Minnen Loep (Course of Love), founded on Boccaccio. In the 15th century the drama was promoted by the Kamer der Rederijker, clubs which acted plays on popular festivals. The reformation brought an outburst of religious literature, which was not merely controversial. Anna Bijns (c. 1494-1575) defended the old faith in glowing verse; Philip poet, who influenced Milton. Dirk Camphuizen (1586-1627) and Constantine Huygens (1596-1687) were great lyric poets; Jakob Cats (1577-1660), didactic, by his 'mixture of canny morality and shrewd, homely wit,' added to religious orthodoxy, found a place in every Dutch household, and founded the school of Dordrecht. Descriptive poems, especially of Dutch river scenes, are conspicuous in Dutch literature; a noted example is Jan van der Goes (De Ystroom). In the drama, Johann Oudaen (d. 1692), Van Focquenbrock, and Rotgans carried on native traditions. Andries Pels, in 1695, founded the literary society, 'Nil volentibus arduum,' and based drama on strict rules, chiefly French. Sybrand Feitama (1694-1758) elaborately translated Voltaire's Henriade. This Augustan age, as in England, produced epics—e.g. Hoogyliet's Abraham (1763) and one great history of Holland, that of Van Waagenaar. Simple prose was



Netley Hospital.

[Photo by Topical Press Agency.

the 12th century; in 16th-century writings three varieties are distinguished -Vlaamsch, Brabantsch, Hollandsch. Unification was pro-moted by the severance from Spain and the Spanish Netherlands towards the end of the 16th century, by the first Dutch grammar (1585), the poems of Vondel (1587-1679), the authorized Dutch version of the Bible (1626 37), the growth of the drama, and the literary society, 'Nil volentibus arduum,' which tended to regularize spelling and phraseology. A large influx of foreign words took place in the 18th century, as in German, and a purification in the 19th. The Batavian republic set up an official grammar and or-thography, the latter being modi-fied in 1883 in accordance with Te Winkel and Vries's great dictionary (1864 seq.). As in France, recent writers have introduced new words, and brought the litorary language nearer the colloquial. Both are still inflectional, but less so than German. Lit-

van Marnix de St. Aldegonde, general and diplomatist (1538-98), satirized the Roman Church. The great Erasmus, Daniel Heinsius the poet, Hugo Grotius the jurist, and Baruch Spinoza the philosopher must be men-tioned, though they wrote in Latin. So must the scientists of this and the next century—Simon Stevin the mathematician, Christian Huygens the physicist, and Graaf, Leeuwenhock, and Boerhaave, the physicians. Renaissance influences were largely spread by the Eglantine Kamer der Rederijker in Amsterdam, of which Römer Visscher (the Dutch Martial, 1545-1620) and Heinrich Laurenszoon Spieghel (1549-1612) were members. This chamber developed the native drama, pioneers in which are Samuel Coster (fl. c. 1617-60) and his abler friend Gerbrand Brederoo. Pieter Hoofdt (1581-1647) is also an eminent dramatist. But the greatest dramatist is Joost van Vondel (1587-1679), also a lyric written by Justus van Effen (Hollandsche Spektator, 1731-5), an imitation of Addison's. There was much translation of French, Italian, and Spanish romances; but the Frisian brothers, Willem and Onno van Haren, wrote verse of a more native cast, and two authoresses, Elizabeth Bekker (Wolff) and Agatha Deken, wrote much-praised novels of Dutch life (e.g. Sara Burgerhart), somewhat in the manner of Clurissa Harlowe. As in Germany and England, a reaction against classicism followed. Hendrik Tollens (1780-1856), a thoroughly national poet, had many imitators. Willem Bilderdijck (1756-1832), lyric, epic, and dramatic poet, though unpopular during life as being anti-liberal, is the greatest name in Dutch literature after Vondel. After Bilderdijck a new period begins. Jakob van Lenen (1802-68), poet, dramatist, and romancer, was the Dutch Walter Scott. Among a host of other writers of the middle third

of the 19th century, we can only name Bogaers (1795-1870) and De Genestet (1830-61), poets; Nicolaas Beets (1814-1903), poet, novelist, and theologian; Mrs. Anna Bosboom - Toussaint (1812-86), a popular novelist; Edward Douwes Dekker (1820-87), poet and novelist ('Multatuli'), whose novel Max Haveluar attacked the abuses of Dutch rule in Java. De Gids, a journal founded in 1837 by Potgieter and others, did nuch to stimulate and purify much to stimulate and purify Dutch literature. A similar service has been performed by Die Nieuwe Gids (1873 seq.), the organ of a new school. Of a host of recent writers, many of them much influenced by contemporary French literature, we can name only Hélène Lapidoth-Swarth, lyric poetess; Adele Opzoomer (A. S. C. Wallis), a popular novelist; and Louis Couperus, poet and novelist. In Biblical scholarship Kuenen of Leyden, in Greek Cobet of Leyden (1813 89), have taken a very high place. See Schneider's Geschichte der niederländischen Litteratur (1888). For the language, see Winkel in Paul's Grundriss d. Ger. Sprache.

Nethersole, OLGA (1870), English actress, born in London, first appeared at the Theatre Royal, Brighton, in 1887, and after an engagement at the London Adelphi she joined the Garrick Theatre. After a visit to Australia (1890) she became lessee and manager (1894) of the Court Theatre, London; in 1898 manager of Her Majesty's Theatre, where she produced The Termagant; and in 1902 manager of the Adelphi Theatre. Her chief characters are Sapho in the dramatic version of Daudet's novel, Janet Preece in *The Propligate*, and the

heroine of La Tosca.

Néthou. See Pyrenees. Noticy, vil., Hampshire, England, 3 m. s.e. of Southampton; has ruins of an abbey, temp. Henry III., and the military hospital. The Royal Victoria Hospital was opened in 1863, for the reception of invalided soldiers. It has accommodation for over one thousand patients. A recreation ground was presented by Mr. Tankerville Chamberlayne in 1900.

Nettle, a genus of herbaceous plants belonging to the order Urticacea. They bear stainens and pistils in separate flowers, the staminate flowers having a perianth of four leaves, whilst the pistillate flowers have one of two leaves. The two common British species are the great nettle (Urtica dioica), with heartshaped leaves tapering to a point, and long branched clusters of small greenish flowers; and the small nettle (U. urens), with elliptical flowers. A burning juice

is emitted by both when the leaves or stems are touched. The dead nettles (Lamium album and L. purpurcum) can be distinguished from the above by their white or purple flowers and square steins.



Nettle (Urtica dioica). 1. Male flower; 2, female flower.

Nettlerash. See URTICARIA. Nettleship, HENRY (1839-93), English Latin scholar, was born at Kettering, Northamptonshire. In 1868 he became an assistantmaster at Harrow; but in 1873 returned to Oxford as lecturer, and in 1878 was elected to the Corpus professorship of Latin, an office which he held till his death. Besides superintending numerous editions of Conington's Virgil and Persius, he edited the Essays of Mark Pattison (1889), and the second edition of Patti-son's Casaubon (1892). He was also engaged, as joint-editor, on Seyffert's Dictionary of Classical Antiquities (1891). He wrote Virgil for Green's series of Classical Writers (1879), Lectures and Essays (1885), besides contributing to Smith's Dictionary of Greek and Roman Antiquities.

Nettleship, RICHARD LEWIS (1846-92), youngest brother of Henry Nettleship, was born at Kettering, Northamptonshire. He published an essay on The Theory of Education in Plato's Republic in Hellenica (1880), wrote a Life of T. H. Green for the third volume of Green's Works (1880), and formed collections for a history of the Normans in Italy and Sicily. He died of exposure on the Alps.

Nettle-tree, a deciduous tree of the genus Celtis, a subdivision of the order Ulmaceæ. It bears hardy, fleshy drupes, which are edible, and pleasantly flavoured

if left till touched by frost. australis, the European nettletree. is common in the south of Europe, and produces fine tim-ber. All are handsome trees, with much-branching habit.

Neubrandenburg, tn., grand-duchy of Mecklenburg-Strelitz, Germany, on Lake Tollense, 125 m. by rail E.S.E. of Lübeck; has a grand-ducal residence, and monuments to Fritz Reuter and Gellert. On a height overlooking Lake Tollense is the grand-ducal castle of Belvedere. Pop. (1900) 10,559.

Neuchâtel. (1.) Swiss canton, bordering on France. Area, 312 sq. m.; pop. (1900) 126,279, mainly Protestant and Frenchspeaking. It was admitted into the confederation in 1815, and was ruled from 1707 by the King of Prussia, whose rights were given up in 1857. Its chief industry is watchmaking, but good wines are grown. (2.) Capital of above services. ital of above canton, on N.W. shore of Lake of Neuchatel. It is dominated by its castle and collegiate church, and is much frequented for its excellent educational establishments. It manufactures watches and jewellery. Pop. (1900) 20,843. (3.) Lake, in

Pop. (1900) 20,843. (3.) Lake, in above canton, with an area of 92s sq. m. and a depth of 505 ft.

Neue Freie Presse, Die ('The New Free Press'), the principal organ of the German Liberal party in the Austrian empire. It was founded in 1864 by Max Priedling area of the German Etienne. Friedländer and Michael Etienne. It is published in Vienna, and has

two editions daily.

Neufahrwasser. See Danzig. Neufeld, Carl (1856), prisoner detained in Khartum for twelve years by the khalifa. A German trader, he left Wady Halfa with a caravan in 1887, intending to trade in the Sudan, but was captured, and kept a prisoner at Omdurman until released by Lord Kitchener in 1898. Neufeld has described his sufferings and the death of General Gordon in A Prisoner of the Khaleefa (1899).

Neuhaus, tn., Bohemia, Austria, 70 m. s.s.e. of Prague; has manufactures of woollen goods. The castle of Count Czernin dates from the 13th century. (1900) 9,316.

Neuhäusel (Hung. Ersekuj-rár), tn., Neutra co., Hungary, 16 m. N. of Komorn. It has a Fran-ciscan convent. Neuhäusel was captured by the Turks in 1663, but retaken in 1685 by Charles of Lorraine. Pop. (1900) 13,204.

Neuilly-sur-Seine, tn., dep. Seine, France, on r. bk. of Seine, just N. of the Bois de Boulogne, is substantially a Parisian suburb. It possesses machine-shops and manufactures of embossed leather and carpets. Here stood, till it was burnt down in the revolution of 1848, the beautiful Château de Neuilly, built by Louis XV., and the favourite residence of Louis-Philippe. Pop. (1901) 37,493.

Neumunster, tn., Prussian prov. of Schleswig-Holstein, 51 m. by rail N. of Hamburg; has tanneries, paper and cotton mills, railway repairing shops, and breweries. Pop. (1900) 27,335.

Neunkirchen, mrkt. tn., Lower Austria, 37 m. s.s.w. of Vienna. It has woollen and cotton mills, ultramarine factories, and exports screws, nuts, and nails. Coal is mined. Pop. (1900) 10,831.

Neuossegg, tn., Bohemia, Austria, at s. foot of Erzgebirge, 16 m s.w. of Aussig, with lignite mines. Pop. (1900) 8,817.

Neu-Pommern ('New Pomerania'), largest isl, in Bismarck Archipelago, W. Pacific, lies 50 m. N.E. of New Guinea, and is separated from it by Dampier Strait. Area, 9,600 sq. m. Formerly called New Britain, it became part of a German protectorate in 1884, and in 1885 its name was changed to Neu-Pommern. White pop. (1900) 259.

Neuquen, territory, Argentina, with Chile to the w. Area, 42,345 sq. m. It is traversed by spurs of the Andes. Cattle, horses, and sheep are reared. The capital is Chosmalal. Pop. (1902) 16,874.

mostly Indians.

Neuralgia, a painful affection the nerves. The pain may be of the nerves. referred to a specific area, or to an organ at a distance from the seat of irritation, in which case the neuralgia is often called re-The commonest cause is debility, such as that produced by anamia or malaria. Neurotic, gouty, and rheumatic subjects are predisposed to the affection, and in such patients cold or reflex irritation from a decaying tooth may be the exciting cause. Plumbism and other forms of chronic poisoning are also frequently accompanied by severe neuralgic pains. Superficial neuralgia is generally unilateral, and it is the fifth or trifacial nerve that is most often involved. When the ophthalmic branch is most involved. the eye may weep, and the conjunctiva be injected. Neuralgia in this situation is often called tic douloureux, and is perhaps the most intractable form of the disorder. The pain is frequently paroxysmal and periodic, and herpes may accompany or follow it. The nerves about the huttock are also extremely subject to neuralgia, especially in Germany. Intercostal neural-gia is frequent, and if severe may be aggravated by the development of herpes zoster or shingles. Visceral neuralgias occur most frequently in neurotic women, and are often associated

with pelvic disease, or with ovarian and uterine derangements. Those of the kidney, the stomach, and the heart are known respectively as nephralgia, gastralgia, and cardialgia. Nephralgia may be so intense as to simulate renal calculus, while cardialgia produces one form of angina pectoris. Neuralgias of mixed nerves may produce temporary paralysis, or in some cases spasm, of the muscles; and long-continued neuralgias are generally followed by a certain degree of muscular atrophy. Associated with nearly all neuralgias, there may be de-rangements of tactile sensation, such as hyperæsthesia or anæsthesia of part of the adjacent skin. Vasomotor changes are also common, and the skin may be at first cool, and later hot and burning, with sometimes local edema or erythema. In a few cases trophic changes cause blanching of a small patch of the hair, which may even fall out. Treatment.—Causes of reflex irritation should be removed, and in most cases tonic, dietetic, and hygienic measures should be adopted in order to improve the general health. Iron, arsenic, cod-liver oil, a generous diet and open-air life, are all calculated to enrich the blood and to diminish the patient's suffering. Quinine is useful in some cases, as are antipyrin, exalgin, and phenacetin; but such drugs should be taken only under medical supervision. For facial neuralgia butyl chloral is often exceedingly efficacious, while in many cases gelsemium is of service. Morphine and the other preparations of opium should be withheld, or administered only when the pain is unbearable and when other remedies fail. As a rule, alcohol should be eschewed. Locally advantage is derived from counter-irritation by the thermo-cautery, or by blisters; from the application of aconite, belladonna, and chloroform; and from freezing by the evaporation of ether, ethyl chloride, and menthol; as well as from galvanism. In the more obstinate cases the pain is often relieved by drycupping, acupuncture, and nervestretching, or by excision of a portion of the inflamed nerve, although too often the relief obtained from such heroic measures is only temporary.

Neurasthenia, in medicine, a disease of the nervous system, often spoken of as 'nervous exhaustion,' depending apparently upon overdrafts upon the supply of nerve-energy. Neurasthenia may result from overwork or overplay, though it is far more likely to occur through worry than through work. It may also show itself after a severe shock to the nervous system, and may be some

considerable time in developing. In its commoner forms it is seen more frequently in women than in men. It must not be confounded with hysteria, but the one may co-exist to some extent with the other. Sexual excesses and burning the candle at both ends' will also explain many cases in males. Females may frequently pave the way to neurasthenia by inattention to the ordinary rules of hygiene, and by social dissipations, with late hours and excessive stimulants, most frequently tea. The tendency to neuras-thenia is strongly hereditary. The great symptom is an increasing inability for any mental or physical exertion, slight tasks being performed only with a great effort, and producing disproportionate exhaustion. The neurasthenic may also develop gastric and other symptoms, sleeplessness, and unwarranted fears. Treatment in any pronounced case is based upon the Weir-Mitchell system, which consists of four essential features - isolation of the patient, absolute rest in bed, massage, and 'over-feeding' (i.c. feeding much more liberally than the average person feeds under average conditions). The patient is, to start with, fed entirely on skimmed milk; may not see or write letters, or even talk much; and is massaged at first for about half an hour twice daily. After a few days food is very gradually increased until at last she is taking four good meals in the twenty-four hours, with two quarts of skimmed milk between the meals. The digestion of these large quantities of food is rendered easy by means of the massage, and the development of fat is not allowed; either the food is decreased or the massage is increased if fat becomes over-abundant. Recovery is always slow, though generally steady, and takes six weeks in the best cases. Electricity is sometimes used in addition to massage.

Neuritis, or inflammation of a nerve, may arise from rheuma-tism, exposure of the nerve in an open sore, and traumatism. Considerable hyperæmia, swelling, and proliferation of cells result from neuritis; and in inflammation of intercostal or other spinal nerves a skin eruption, called herpes zoster, may appear on the area supplied by the nerve. Treatment should be adapted to remove such general causes as gout, rheumatism, or syphilis, and small doses of potassium iodide are often useful. Locally, sloughing sores or decayed teeth may demand attention; and leeches, blistering, fomentations, and soothing applications are all of service in relieving the pain and

subduing the inflammation.

Neuroma, a nerve tumour, which may be true (i.c. made up of nerve tissue) or false (of other tissue, most often fibrous, simply attached to a nerve). See NER-VOUS SYSTEM.

Neuroptera. See Insects. Neuruppin, tn., prov. Brandenburg, Prussia, on Lake Ruppin, 41 m. by rail N.W. of Berlin, with various industries. Pop. (1900) 17,130.

Neusalz, tn., Prussian prov. Silesia, Germany, on the Oder, 80 m. by rail N.W. of Breslau. The Moravian Brethren settled here in 1744. It manufactures cardboard, enamels, and machinery. Pop. (1900) 12,580.

Neu-Sandec (Pol. Nowy Sacz), tn., Austrian Galicia, 42 m. by rail s.w. of Tarnów. It has an old castle and railway repairing shops. Trade is done in onions. Pop. (1900) 15,724.

Neusatz (Hung. Ujvidék), tn., Bács-Bodrog co., Hungary, on l. bk. of Danube, opposite Peterwardein, at mouth of Franz-Josef Canal, 50 m. N.W. of Belgrade. It exports pigs, fruit, and cereals. In 1849 the town was almost destroyed. Pop. (1900) 28,763.

Neusiedler See (Hung. Fertö-Hungary; covers an area of 140 Tava), lake, Wieselburg Its average depth is only sa. m. from 10 to 12 ft., and it is surrounded by marshes. It abounds in fish and wild fowl; the remains of lake-dwellings were found when it dried up entirely (1865).

Neusohl (Hung. Beszterezebanya), tn. and episc. see, cap. of Sohl (Zólyom) co., Hungary, at confluence of rivers Gran and Bistritz, 127 m. by rail N. of Budapest. The cathedral contains a beautifully carved altarpiece (14th century) and font. There are iron and copper mines, sugar refineries, and potteries. Pop. (1900) 8,681

Neuss, tn., Prussian Rhine Province, Germany, 7 m. by rail w.s.w. of Düsseldorf. Its beautiful Roman Catholic minster dates back to 1209. Neuss produces screws and nails, paper, soap, candles, starch, chocolate, and suerkraut. It has iron foundries, flour mills, tanneries, and breweries. Pop. (1900) 28,472.

Neustadt, tn., Prussian prov. Silesia, 39 m. by rail s.w. of Op-It has tanneries, carpet peln. factories, and sawmills. Here encounters occurred between the Austrians and Prussians in 1745, 1760, and 1779. 20,139. Pop. (1900)

Neustadt-on-the-Hardt, tn., Bavarian palatinate, 32 m. n.w. of Karlsruhe, with a considerable trade in wine, cloth, paper, tobacco, etc. A school for viticulture was established here in 1899. Pop. (1900) 17,795.

Neustettin, tn., Prussian prov. Pomerania, 56 m. s. E. of Kolberg. It has iron foundries, dye works, breweries, and sawmills. Pop. (1900) 10,624.

Neustrelitz, cap. of grand-duchy of Mecklenburg-Strelitz, Germany, 62 m. N.N.W. of Berlin. It contains two grand-ducal palaces, and has distilleries, breweries, foundries, furniture fac-tories, and gardening. Pop. (1900) 11,340. In the castle of Hohenzieritz Queen Louise of Prussia died (1810).

Neustria, the name given in the time of the Merovingians to the western portion of the Frankish empire, in contrast to Austrasia. See FRANKS.

Neutitschein, tn., Moravia, Austria, 37 m. by rail E. of Olmütz, with manufacture of carriages, woollens, machinery, tobacco, and hats. It has a Byzantine church and an old castle.

Pop. (1900) 11,891.

Neutrality, the condition of a nation which takes no part in a war. The duties and rights involved are determined by international law. By the end of the 17th century it was already established that a neutral state must refrain from giving active assistance to either belligerent: but there were still uncertainty and laxity as to how far a neutral state was bound to prevent its territory from being used for hostile purposes. When war broke out in Europe in 1793, the position taken up by the United States substantially expresses the doctrine of neutrality as it exists to-day. The United States declared that it is the duty of a neutral state to prevent any such acts as would injure one of the warring powers-c.g. arming vessels or raising troops within its ports or territories. Although regarded as a matter of courtesy, it is customary and almost obligatory on the part of belligerents to notify neutral states of the outbreak of war. A neutral state may then issue a proclamation of neutrality, or it may not. A proclamation of neutrality is binding upon the subjects of the issuing state, and gives notice to the belligerents of the view which that state takes of its duty on doubtful points, but it does not affect the general law of neutrality. A neutral state must not assist a belligerent with troops, ships, arms or ammunition, or money, nor allow its ports or territory to be used for hostile purposes; and those privileges and advantages which by the custom of nations are granted by neutrals to belligorents must be impartially allowed to both sides. For example, the ships of war of either belligerent are allowed to enter neutral ports and stay for a limited time (under English proclamations twenty-four hours), and to obtain necessary provisions and repairs to enable them to continue their voyage, and enough coal to take them to their own nearest port. A neutral state is also bound within reasonable limits to prevent its subjects from assisting either of the belligerents. It must not allow troops to be raised in its territory, nor vessels to be armed and fitted out in its ports, nor any act of sovereignty to be exercised within its jurisdiction on behalf of a belligerent. See FOREIGN ENLISTMENT ACT.

But a neutral state does not interfere with the private commercial transactions of its subjects with belligerents; and a belligerent is free to raise a loan in the money market of a neutral, or to buy goods in a neutral country, whether contra-band of war or not. But, on the other hand, the subjects of a neutral state acting outside its jurisdiction are bound to submit to the rights of belligerents with regard to visit and search, capture and confiscation in the case of contraband of war, or when attempting to run a blockade. The question of the right to seize goods of the enemy carried in neutral vessels, or to seize goods of a neutral carried in vessels of a belligerent, was for long a matter of the keenest controversy. It was practically settled by the Declaration of Paris as far as the parties to it are concerned; and although Spain and the United States have never given their adherence to the declaration, they have observed its principles when actually at war. So it may probably be taken as finally settled that a neutral flag covers the enemy's goods except contraband of war; and neutral goods, except contraband of war, are not liable to confiscation under the enemy's flag. See also BLOCKADE, CON-TRABAND OF WAR, DECLARATION OF PARIS, PRIVATEER, and PRIZE; also Hall's International Law (5th ed. 1904).

Neuville, Alphonse Marie de (1836-85), Frenchmilitary painter, born at St. Omer; studied under Delacroix, and achieved considerable success with his earlier pictures, which dealt with incidents in the Crimean war, the Italian campaign of 1859, and other wars in which French arms took part. He also made his mark in illustration, especially of Guizot's Histoire de France. His service as an officer in the Franco-German war dowered his work with a new vigour, which, combined with his mastery of colour, raised him to a high rank among con-

temporary painters.

Neuwied, tn., Prussian Rhine Province, on r. bk. of Rhine, 94 m. by rail N.W. of Koblenz. The castle contains a fine collection of Roman antiquities, discovered here in 1791. Here are famous Moravian schools. Pop. (1900)

Neva, riv., N.W. Russia, on which St. Petersburg stands; flows from Lake Ladoga into Gulf of Finland (Baltic Sea). Length, 40 m.; area of basin, including drainage areas of great lakes, over 115,000 sq. m. On an average it is ice-free 218 days, during which its lower course can

high which its lower course can be navigated by large vessels.

Nevada. (1.) A western state of U.S.A., between 35° and 42° N. lat. and 114° and 120° w. long., with an area of 109,740 sq. m. It was organized as a territory in 1861, and admitted as a state in 1864. Nevada lies almost entirely within the Great Basin, an area without drainage to the sea, the southern point only being drained to the Pacific by Colo-rado R. Its surface consists of a succession of narrow mountain ranges trending nearly N. and s., and separating broad, level, desert valleys, each forming a self-contained area. The principal river is the Humboldt, which disappears in Humboldt Lake. The altitude ranges from a few hundred feet at the s. to 13,058 feet on Wheeler's Peak, mostly over 5,000 ft. The mineral products consist mainly of gold, silver, and lead. The mineral production has greatly shrunk in recent years, owing to the exhaustion of the Comstock Lode. Cap. Carson City. Pop. (1900) 42,335. This is the most sparsely populated of all the states, with but 0'4 inhabitants to a sq. m. Nearly one-fourth of the inhabitants are of foreign birth. (2.) City, Missouri, U.S.A., co. seat of Vernon co., 90 m. s. of Kansas City. Pop. (1900) 7.461. (3.) Town, Nevada co., California, U.S.A., 2,500 ft. above sea-level, 56 m. N.N.E. of Sacramento; is a favourite health resort. Gold-

a favourite neator resort. Gott-mining and fruit-growing are carried on. Pop. (1900) 3,250.

Nevel, tn., Vitebsk gov., W. Russia, 62 m. N.N.W. of Vitebsk town. It has tanneries, brick works, flour mills, and candle factories. Pop. (1897) 9,988. Nevers (Rom. Noviodunum),

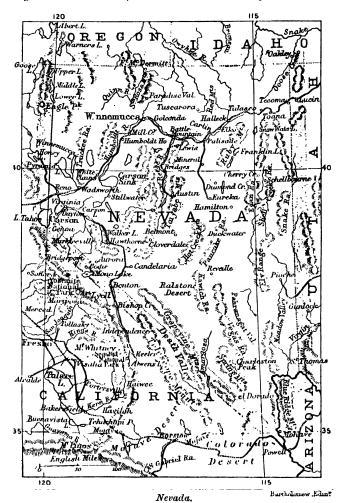
tn. and episc. see, cap. of dep. Nièvre, France, at confluence of Loire and Nièvre, 132 m. S.E. of Paris. The chief buildings are the cathedral (11th to 15th century), with an apse at either end, and the Palais de Justice (1475), the residence of the former dukes of Nevers. Manufactures chains, cables, and agricultural implements; but the most famous is majolica pottery, introduced

from Italy in 1565. Pop. (1901)

27,673. Neville. See WARWICK, EARL

Neville, HENRY (1620 94), English political writer, was born in Berkshire, and became a member of the Council of State in 1651. Coming into collision with Cromwell, he was forced to retire during the latter's lifetime, but reconcerning Government (1681), and translated several works of Machiavelli.

Neville, HENRY GEORGE (1837), English actor, was born in Manchester, and made his first appearance in London at the Lyceum, in 1860, as Ardent, in Boucicault's Irish Heiress. Since that time, among his notable successes have been Bob Brierly in The Ticket-



entered Parliament in 1658. His strongly republican views were shown in his opposition to the House of Lords as an institu-tion. In 1663 he spent a short time in the Tower, under an unfounded accusation of treason. He wrote The Parliament of Ladies (1647) and similar skits; also The Isle of Pines (1668), Plato Redivivus, or a Dialogue of-Leave Man, Pierre in The Two Orphans, Lord Clancarty in Clancarty, and Triplet in Masks and Faces. From 1873 to 1879 he was lessee and manager of the Olympic Theatre, London, and in 1884 founded a school of dramatic art. He is the author of The Stage, its Past and Present (1875), and Voice, Speech, and Gesture (1895). Nevis, isl., Leeward group, British W. Indies, 2 m. S.E. of St. Kitts, with which it is connected for administration. is an extinct volcano (3,600 ft.), with cultivated slopes, bearing limes, oranges, and sugar-cane. Charlestown is the capital. Nevis was colonized by the British in 1628. It is subject to hurricanes (a disastrous one in 1899) and Pop. (1901) 12,774.

Nevis, Ben. See Ben Nevis.

Nevski Prospekt, St. Peters-

burg's finest street; extends for

about three miles.

Nevyanskii Zavod, tnship., Perm gov., N.E. Russia, 45 m. N.N.W. of Ekaterinburg city. It has iron foundries, amethyst mines, and gold washings. Pop. (1897) 16,066.

New Albany, city, Indiana, U.S.A., co. seat of Floyd co., on the Ohio, 4 m. N.W. of Louisville. It manufactures tanned leather,

woollen goods, plate glass, and furniture. Pop. (1900) 20,628. New Amsterdam. (1.) Seaport, British Guiana, on E. bk. of Berbice, near confluence of Canje, 64 m. s.E. of Georgetown. Pop. 9,000. (2.) Name of New York City under the Dutch.

Newark. (I.) UPON TRENT, munic. bor., Nottinghamshire, England, 19 m. N.E. of Nottingham. The parish church dates chiefly from the reign of Henry VI. The town has a handsome coffee palace, presented by Viscountess Ossington, and the Free Grammar School (1530). There is trade in corn and malt; iron and brass founding, the manufacture of agricultural implements, beer, and plaster of Paris. Gypsum and limestone are quarried. A castle was rebuilt in the 12th century by the bishop of Lincoln, who also had a mint Among historical events are the death of King John (1216), the three sieges of the civil war, and the surrender of Charles I. to the Scottish army. After its surrender to the Parliament in 1646 the castle fortifications were demolished. The ruins are now surrounded by a public pleasure ground. Pop. (1901) 14,985. (2.) City, Essex co., New Jersey, U.S.A., 10 m. w. of New York. Its chief manufactures are leather, malt liquors, jewellery, foundry and machineshop products, fur goods and hats, chemicals, bread, boots and shoes, and varnish. There are also works for reducing and refining gold and silver, and for allowing the state of the state slaughtering and meat-packing. Pop. (1900) 246,070. (3.) City, Ohio, U.S.A., co. seat of Licking co., on Licking R., 35 m. E.N.E. of Columbus. It manufactures electric cars, glassware, and locomotives. Pop. (1900) 18,157.

New Bedford, city, Massachusetts, U.S.A., co. seat of Bristol co., on Buzzard's Bay, 56 m. s. of Boston. The whaling industry was at one time of great importance, but cotton manufacture is now the chief industry. Pop. (1900) 62,442.

Newbern, city, N. Carolina, U.S.A., co. seat of Craven co., 80 m. N.E. of Wilmington. Pop.

(1900) 9,090.

Newbery, JOHN (1713-67), English publisher, was a native of Waltham St. Lawrence, Berkshire. He began publishing at Reading in 1740, and in 1744 removed to London. He was publisher of the Public Ledger, the Idler, the Rambler, Johnson's Lires of the Poets, the Literary Magazine, and was intimately acquainted with Johnson and Goldsmith, the latter of whom describes him in The Vicar of Wakefield. Newbery is especially remembered for his 'Juvenile Library,' which included Giles Gingerbread, Margery Two Shoes, and Tommy Trip. He also published the Lilliputian Magazine. See Welsh's A Bookseller of the Last Century (1885).

Newbolt, HENRY JOHN (1862), English poet and journalist, was born at Bilston, Staffordshire, and practised at the bar until 1899. After the success of his volume of patriotic verse, Admirals All (1897), he took to a literary career, and founded in 1900 the Monthly Review, of which he was editor until 1904. Works: Taken from the Enemy (1892), Mordred (1895), The Island Race (1898), Stories from Froissart (1899), Froissart in Britain (1900), The Sailing of the Longships (1902), Songs of the Sea (1904), and The

Year of Trafalgar (1905).

New Brighton. (1.) Town, Beaver co., Pennsylvania, U.S.A., 29 m. N.W. of Pittsburg, and connected by bridge with Beaver Falls; has manufactures of bricks, drain-pipes, pottery, and glass. Pop. (1900) 6,820. (2.) Former tn., at N.E. end of Staten I.; has since 1898 become part of

New York. Pop. (1900) 21,441.

New Britain, city, Hartford
co., Connecticut, U.S.A., 10 m.
s.w. of Hartford. Famous for
its hardware. Pop. (1900) 25,998. New Britain. See NEU-Pom-MERN.

New Brunswick. (1.) Province of Dominion of Canada (area, 27,985 sq. m.), lies s. and s.E. of the prov. of Quebec. Its coast-line is broken by the isthmus which joins Nova Scotia to the mainland. Bay Chaleur, Northumberland Strait (which separates the province from Prince Edward Island), and the Bay of Fundy form its N.E. and S.E. boundaries. The coast-line (545 m.) is indented by numerous

fine harbours, some of which, like that of St. John, are never closed by ice. The chief river, the St. John, is navigable by large steamers as far as Fredericton, capital of the province (84 m.). Among the others are the Miramichi (220 m.) and the Restigouche, a famous salmon stream. The surface is undulating, and diversified by many small lakes. The major portion of the surface is still covered with dense forests. The inhabitants (331,093 in 1901) are almost entirely of New Brunswick birth (95 per cent.). The French are partly descendants of the original Acadians, and partly immigrants from Quebec. There were, in 1900, 1,309 Indians. Roman Catholics are in a majority, with 125,698; the other denominations claiming-Baptists, 80,946; Church of England, 41,767; Methodists, 35,973; and Presbyterians, 39,424. In addition to the provincial university there are other two degree - conferring institutions, both of a denominational character. The lieutenant-governor is assisted by an Executive Council and a House of Assembly of forty-six members. The climate is one of extremes, but, except on the immediate coast, is very dry. The chief industries are connected with lumber. Shipbuilding is carried on. Coal is mined, and there are deposits of antimony and gypsum. The fisheries give employment to a considerable number of men. Lobsterpacking is an extensive industry. In 1904 the imports amounted to £1,116,495, and the experts to £2,709,608. Moose and caribou are abundant. New Brunswick was made a separate colony in 1784, and its earlier history is that of and its earlier history is that of Nova Scotia. Both New Bruns-wick and the state of Maine claimed the fertile Aroostook valley; but by arbitration the greater part was awarded to Maine (Ashburton Treaty, 1842). (2.) City, New Jersey, U.S.A., co. seat of Middlesex co., 30 m. N.E. of Trenton. It contains Rutger's College and manufac-

Rutger's College, and manufac-tures hosiery. Pop. (1900) 20,006. Newburgh, city, Orange co., New York, U.S.A., on W. bk. of Hudson R., 55 m. N. of New York City. It manufactures clothing and machinery. Pop. (1900)

Newbury, munic. bor., mrkt. tn., and par., in Berkshire, England, on the Kennet and the Kennet and Avon Canal, 17 m. s. by w. of Reading. Jacobean Cloth Hall is a relic of the former stable industry. There former staple industry. is a trade in malt and wool. A bed of peat in the vicinity has yielded fossils and anti-quarian objects. Newbury is

famous for two battles (1643 and 1644) fought here during the civil war. Donnington Castle, about two miles N.N.W., was long traditionally, though it would seem incorrectly, associated with the poet Chaucer. It made a brave defence during the civil war, when Colonel Boys held it for the king. Pop. (1901) 11,061.

Newburyport, city, Massachusetts, U.S.A., co. seat of Essex co., at mouth of the Merrimack, 35 m. N. of Boston. It produces boots and shoes and cotton cloths, and has shipbuilding. Pop. (1900) 14,478.

cotton cloths, and has shipbuilding. Pop. (1900) 14,478.

New Caledonia, isl. in W.
Pacific, 700 m. E. of Queensland.

It runs 250 m. N.W. to S.E., with

ports (1905), £429,000; exports, £442,800. Nouméa is the capital and chief port. There is in Nouméa a technical college, and at Yahoué an agricultural school. Pop. (1901) 57,415, of whom 12,253 are free Europeans, and 29,106 Kanakas. Total penal pop. (1902) 9,745. Discovered in 1774, it was (1853) annexed by

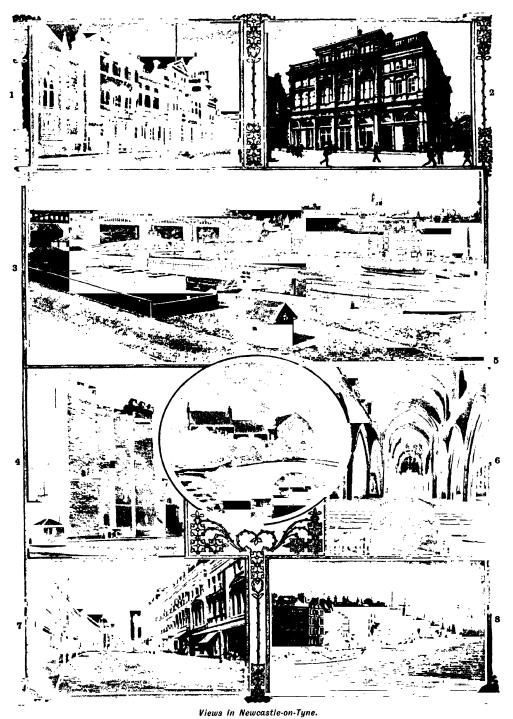


Newbury, John Strong (1822-92), American geologist; from 1855 to 1861 was chiefly engaged in investigations into the geology, flora, and fauna of California, Utah, Arizona, and other states. He held a professorship at the Columbia School of Mines; in 1869 he became state geologist of Ohio, and in 1884 palæontologist to the United States Geological Survey.

a breadth of about 30 m. Area, including dependencies, 7,650 sq. m. It rises to 5,600 ft., fully half of it being mountainous, and 3,000 sq. m. pastoral and cultivable land. The climate is excellent, and the fertile soil grows coffee, tobacco, maize, manioc, grapes, pineapples, and sugarcane. The mineral output includes nickel, chrome, and cobalt ores; coal is also found. Im-

France, which, after 1871, dispatched large batches of political prisoners. The dependencies of New Caledonia are the Loyalty Is., Wallis Archipelago, Isle of Pines, Huon Is., Futuna, and Alafi.

Newcastle. (1.) Town, N.S.W., Commonwealth of Australia, at mouth of Hunter R., 62 m. N.N.E. of Sydney. It ships coal, wool, and frozen meat. Pop.

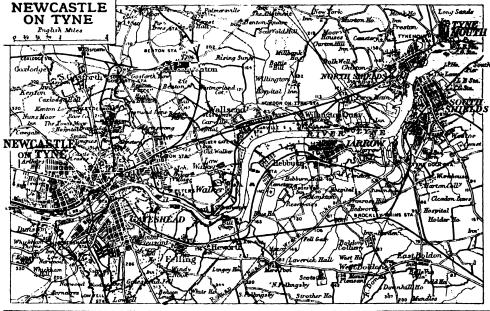


Views in Newcastie-on-lyne.

1. Free Library. 2. Town Hall. S. Newcastie from Hillcate. 4. The 'New Castle' (now known as the Old Castle). 5. The Old Mill, Jesmond Dens. 6. St. Nicholas's Cathedral, interior. 7. Grey Street. 8. Quayside. (Photos 1, 2, 4, 5, 6, and 8 by Rock Bros.; 3 and 7 by Valentine.)

(1901) 14,250. (2.) Pastoral dist. in N.B. of colony, traversed by the great Dividing Range. It forms a table-land 3,000 it. above sealevel, and has an area of 13,100 sq. m. The climate is genial, but is severe in winter. Silver and tin are found, but sheep and cattle raising are the principal occupations. Pop. (1901) 17,702. (3.) Capital of Newcastle div., at extreme N. of Natal, British S. Africa, 150 m. N.W. of Durban. Pop. (1904) 2,950. (4.) City, Pennsylvania, U.S.A., co. seat of Lawrence co., in an iron and coal region, 42 m. N.W. of Pittsburg. It manufactures tinplate, iron, glass, fire-brick, and steel wire. Pop. (1900) 28,339.

latter was conferred upon his nephew, the Earl of Lincoln, whose descendants, the Pelham-Clintons, have been dukes of Newcastle-under-Lyme in direct lineal succession down to the present time. Among the most noteworthy of the members of the Newcastle family are WILLIAM CAVENDISH, DUKE OF NEW-CASTLE (1592-1676, See CAVEN-DISH). - MARGARET CAVENDISH. DUCHESS OF NEWCASTLE (1624-74), English authoress, daughter of Sir Thomas Lucas; became (1643) maid of honour to Queen Henrietta Maria. In 1645 she married William Cavendish, Cavendish, Marquis of Newcastle. Besides poems which have considerable 1754, when he succeeded his brother, Henry Pelham, in the premiership. With a short interval he retained it until succeeded by Lord Bute in 1762. See Coxe's Memoirs of, the Administration of the Rt. Hon. H. Pelham (1829), and Horace Walpole's Letters (ed. 1904).—HENRY PELHAM FIENNES PELHAM-CLINTON, FIETH DUKE OF NEWCASTLE (1811-64), English statesman, entered Parliament in 1832, but was ousted, through the influence of his father, for supporting the free trade measures of Sir Robert Peel. In 1857 he succeeded to the dukedom, and the following year became Secretary of State for the Colonies, and in 1854



Newcastle, Dukes of. Within the space of a century there were no fewer than four successive creations of dukes of New-castle. In 1664, William Caven-dish, nephew of the first Earl of Devonshire, was created Duke of Newcastle-upon-Tyne. His son and successor having died without male issue, the dukedom of Newcastle was conferred upon the husband of one of his daughters, John Holles, Earl of Clare (1694). This duke also dying without male issue, he bequeathed his estates to Thomas Pelham, his sister's son, who was raised to the dignity of Duke of Newcastle-upon-Tyne (1715) and Newcastle-under-Lyme (1757). The former title became extinct at his death; but the

merit, and plays which have but little, she produced Philosophical and Physical Opinions (1655); Philosophical Exters (1664); Life of William Cavendish, Duke of Newcastle (1667); and her Autobiography. The last two, both reprinted in 1872, are excellent pictures of contemporary life. See Horace Walpole's Royal and Noble Authors (1758), for adverse view.—THOMAS PELHAM HOLLES, DUKE OF NEWCASTLE (1693-1768), British statesman, son of Thomas, Lord Pelham, used his influence on the Hanoverian side at the death of Anne, and was consequently created Duke of Newcastle in 1715. Appointed Secretary of State by Walpole in 1724, he held this post until

Secretary of State for War. The privations and suffering of the British army before Sebastopol raised a storm of discontent in the country, and the duke resigned office. Newcastle was again Secretary of State for the Colonies in 1859. In 1860 he accompanied King Edward VII. (then Prince of Wales) on a tour through Canada.

Newcastle Chronicle, The, was founded in 1764 as a weekly newspaper, but in 1858 it began a daily issue. The property was acquired by the late Joseph Cowen about that time, and it was under his inspiration that it became one of the leading organs of advanced Liberal opinion on independent lines.

Newcastle-on-Tyne, city, munic. co., and parl. bor., North-umberland, England, and port on the Tyne, 10 m. from its mouth. The town is on rising ground on the N. bk. of the river, here crossed by three bridges connecting it with Gateshead in Durham—the High Level Bridge, designed by Robert Stephenson; the Swing Bridge, on the site of the Pons Ælii of Hadrian; and the Redheugh Bridge. Another High Level (Railway) Bridge west of the old High Level Bridge was opened by King Edward VII. in 1906. The castle, of which the keep remains, was founded about 1080, and rebuilt by William Rufus, afterwards rebuilt or strengthened by Henry II. It now contains a museum, with stones of the Roman period. Some portions of the town walls and the sallyport are still standing. The church of St. Nicholas, since 1882 the cathedral of Newcastle, dates from the 14th century, and has a beautiful 15th - century spire. All Saints', St. Andrew's, and St. John's are also ancient foundations. Considerable remains exist of the Black Friars Monastery. The Side is a narrow and very steep street retaining Elizabethan houses, and similar buildings are found at the Sandhill near the river. Certain narrow and steep streets, sometimes rising in steps, are called 'chares, and correspond to the wynds of Scottish towns. In Trinity Chare is Trinity House, with a chapel dating from the 15th century. Grey Street, one of the finest in the kingdom, was designed by John Dobson, and is due to Mr. Richard Grainger, who laid out new streets, erected handsome buildings, all in the Grecian style, and effected other improvements at over £1,000,000. The Central Railway Station (1850) was also designed by Dobson. Near it is Stephenson's monu-Other public buildings ment. include the town hall, guildhall, central exchange, Wood Memorial Hall, public central and branch libraries, natural history museum, and the Laing Art Gallery. The colleges of medicine and science, the latter also with faculty of arts, are both in connection with the University of Durham. The town is exceptionally well provided with parks— Town Moor, the Leazes, Elswick Park, Brandling Park, Heaton Park (containing ruins of a building called King John's Palacel, and Armstrong and Jesmond parks, due to the munificence of Lord Armstrong. Near Jesmond Dene are ruins of an ancient chapel and St. Mary's Well, formerly a pilgrim resort. There are large shipbuilding yards, where battleships and merchant

vessels of all classes are constructed. The Elswick engineering and steel works (72 acres), besides additional works at Scots-wood to the W., turn out all kinds of heavy ordnance; locomotives, marine engines, machinery, heavy iron and steel goods, plate and crown glass, earthenware, chemicals, and carriages represent other branches of manufacturing industry. The total value of the foreign trade, including N. and S. Shields, in 1905 amounted to £17,057,334. Coal is by far the most important export (£4,138,136 in 1905). There are large docks and quays belonging to the North-Eastern Railway Company and to the Tyne Commissioners, the latter body constituting the river authority. Newcastle is the see of a bishop, and returns two members to the House of Commons. Robert, son of the Conqueror, built a fortress here, called New Castle. In 1644 it was garrisoned for the royalists, but after a ten weeks' siege was taken by assault. In 1646 Charles was held prisoner here by the Scots. The boundaries of Newcastle were in 1904 extended so as to include the urban districts of Benwell, Fenhan, and Walker. Pop. (1901) 215,328.

Newcastle-under-Lyme, parl, and munic. bor., Staffordshire, England, 16 in. N.N.W. of Stafford. Cotton goods, clothing, and paper are manufactured, and there are tanneries, breweries, and malt works. The town took its name from a castle erected here in early times, the distinctive appellation being derived, it is said, from the ancient forest of Lyme, itself named from its situation on the limes or border of Cheshire. It returns one member to the House of Commons. Pop. (1901) 19,914.

Newchwang, treaty port in S. Manchuria, China. The name is commonly used for the foreign settlement on the Liao R., 30 m. below Newchwang proper, and 15 m. from the sea. The port is ice-bound in winter. Imports (1905), £7,514,074; exports, £1,844,731, consisting of beans, bean cake, bean oil, silk, and gold. Coal, iron, and silver mines exist. Gold (alluvial) is obtained. During the troubles of 1900, Russia established a predominant position, from which she was ousted by Japan in 1904.

Newcomb, Simon (1835), American astronomer, was born at Wallace, Nova Scotia. Appointed in 1861 professor of mathematics in the United States navy, he took charge of the 26inch refractor erected at Washington in 1873, participated in three eclipse expeditions, and observed the transit of Venus at the Cape (Dec. 6, 1882). As director of the American Nantical Almanac (1877-97) he achieved a colossal amount of work in the revision of lunar and planetary theories and tables, besides acting as professor of astronomy in the Johns Hopkins University from 1894-1901. Best-known writings: Popular Astronomy (1878), The Stars (1902), and Reminiscences of an Astronome (1903)

of an Astronomer (1903).

Newcomen, Thomas (1663-1729), English inventor of the atmospheric steam-engine, was born at Dartmouth. With Savery and John Calley, or Cawley, Newcomen took out in 1705 a patent for what was called a fire-engine. Newcomen, in 1723, set up an engine for drawing water at Griff, near Coventry, of which an account is given in Desaguliers's Experimental Philosophy (1744).



Newcomen's Steam-engine.

a, Boller; b, cylinder; c, piston; d, counterpoise; c, water-pipe. Steam was admitted into the cylinder and then condensed by a jet of water, when the vacuum produced brought down the piston and raised the pump-lucket.

Newdigate, SIR ROGER (1719-1806), English antiquary, sat in Parliament as Tory member for Middlesex (1741-7), and for Oxford University (1750-80). He took a practical interest in the extension of canals and roads, and was a student of ancient architecture; but he is chiefly remembered as the donor (1805) of the Newdigate prize at Oxford University, for the undergraduate who composes the best English poem on a given subject.

New England, the name applied to the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode I. and Connecticut, in N.E. of U.S.A. Sir Humphrey Gilbert explored the coasts in 1583. In 1614 Captain John Smith made an extensive exploration, and suggested that the region should be called 'New England.' After the establishment of the Plymouth colony in what is now Massachusetts in 1620, the lands were gradually settled, and in 1643 Connecticut, New Haven, Massachusetts Bay, and Plymouth colonies formed

the united colonies of New England. The state of Connecticut was formed from the colonies of Connecticut and New Haven; Massachusetts from Massachusetts Bay and Plymouth; Maine was not recognized as separate till 1820.

ton. There are several ancient earthworks (Buckland Rings). The New Forest was enclosed by William the Conqueror, but the charge of depopulating land for this purpose appears to be unfounded. The work of replanting was undertaken in the reigns



Newfoundland.

New Forest, THE, in S.W. Hampshire, England. ('rown forest covers about 100 sq. m., while about 45 sq. m. are private property. The Forest comprises property. The Forest comprises tracts of woodland interspersed with open glades and stretches of moor, waste land, and marsh. Lyndhurst is the principal place, and here are the King's House, Verderers' Hall and Church with fresco by Lord Leighton. In the 8.E. are ruins of Beaulieu Abbey, a Cistercian monastery founded by King John; the refectory is now the parish church. Other noteworthy places are Cadnam; Rufus's Stone, marking the traditional site of the death of William 11.; Minstead, a quaint old village; Boldrewood, famous for oaks, and Mask Ash for beeches: Burley, situated amidst charming scenery; Brockenhurst, whose church is mentioned in Domesday; and Boldre, near Lyming-

of William III. and George III. The Court of Swainmote, which has jurisdiction in matters coming under the forest laws, comprises the crown officials and seven verderers, representing the commoners, or those who have forest rights. See J. R. Wise, The New Forest, its History and Secuery (1883), R. C. de Crespigny, and H. G. Hutchinson (1903).

Newfoundland, isl. in mouth of Gulf of St. Lawrence, separated from Labrador by Strait of Belle Isle (11 m. wide); is roughly triangular in shape, having Cape Bauld on N., Cape Ray on S.W., and Cape Race on S.E. It approaches S.W. within 50 m. of the island of Cape Breton, and its E. projection is 1,640 m. from Valentia off S.W. coast of Ireland. The shores are rugged and rockbound, but are indented by many bays and intets running far inland, and affording numerous safe

and commodious harbours. The area is 40,200 sq. m., of which one-third is lake and river. The longest river is the Exploits (200 m.). Pop. (1901), including Labrador, 224,931. The population is densest in the peninsula of Avalon in s.E., in which is the capital, St. John's. By the treaty of 1904 France renounces her rights on the French shore, with the exception of cleaning and drying fish on shore, but retains the right of fishing in the ter-ritorial waters of the French shore, and secures for her fishermen the right to obtain supplies of bait on that coast, and the right to fish not only for cod but for lobsters. The Roman Catholic Church claims the largest number of adherents, the Church of England comes next, and the Methodists follow. The island is a self-governing colony, and is administered by a governor appointed by the crown, an Executive Council not exceeding 9 members, a Legislative Council of 18, and a House of Assembly of 36. The imports amounted (1904-5) to £2,055,860, the exports to £2,133,870. Some attention is paid to agriculture, and the lumbering and the mineral resources are very great. Newfoundland produces copper, and lead, gypsum, asbestos, and iron and coal exist. Cod, lobster, herring, and seal are fished, and form the bulk of the exports. (For the famous Banks, see article under Grand BANK.) Fisheries were established as early as the beginning of the 16th century, and in 1578 there were 400 vessels, chiefly French and Spanish, engaged. In 1583 Sir Humphrey Gilbert took possession of the island, but no permanent settlements were formed till 1621. In 1855 full responsible government was granted. See Hatton and Harvey's Newfoundland, its History and Present Condition (1883), Prowse's A History of Newfoundland (1897), and Willson's The Truth about Newfoundland (ed. 1901).



Newfoundland Dog.

Newfoundland Dog comes from Newfoundland and Labrador, where it is used as a sledge-dog. A very similar type of animal exists in Norway. The Newfoundland is essentially a



Lyndhurst.
 Lyndhurst Church, interior.
 Beaulieu Church, the Refectory of the Abbey, showing the ancient pulpit.
 Ford near Binetead.
 Swan Green, Lyndhurst.
 Rufus Stone.
 Roldre Church.
 Beaulieu Abbey; on the right the old Refectory, now the Parish Church.
 Brockenburst Church.
 Brockenburst Church.
 Brockenburst Church.

water-dog; its feet are partly webbed, its coat resists water, and it lacks a keen sense of scent. There are two distinct breeds—the large and the small; the popular breed is the former, which is shaggy-coated. From the latter, which is smooth-coated, the retriever is descended. Originally the colours of the dog were red, brown, brown and white, bronze, red and white, and black and white; but these have now given place to two orthodox colours—black (greatly preferred) or black and white. Landseer, in his celebrated picture, A Member of the Royal Humane Society, painted a specimen of the latter colour, and hence they are sometimes called

slight tinge of bronze in the black colour is not a disqualification.

Newgate, a former jail in the city of London, commenced in the reign of Henry I. (1100–35). To rebuild the structure, which had fallen into disrepair, a sum of 20,000 marks was exacted from the wealthy Jews of London in 1241. The original building was destroyed in the great fire in 1666, but the prison was rebuilt in 1770. The interior was also ruined by fire in the Lord Gordon riots in 1780, when 300 prisoners were let loose on the populace—a scene described by Dickens in Barnaby Rudge. Many noted prisoners have been confined within the walls of Newgate—

little known. The Arfak Mts. (10,000 ft.), the higher Charles Louis Mts., the Gautier and Cyclops Mts. are all in Dutch New Guinea. The Owen Stanley (13,120 ft.) and Mount Suckling, are behind Port Moresby in the S.E. There is at least one active volcano, Mount Trafalgar. Many navigable rivers are known, the chief of which are the Amberno (Rochussen) in Dutch Kaisarin Augusta in German, and the Fly in British New Guinea. The rainfall is very heavy, and the climate is excessively hot and humid. The flora resembles that of the Malayan Islands, but has certain Austral



'Landseer Newfoundlands.' The Newfoundland is capable of great endurance. His countenance is expressive, and his eyes full of intelligence. In height he sometimes attains 33 or 34 in., but the average is about 30, and the normal weight 100 lbs. for dogs and 85 lbs. for bitches. Points:—Head broad and massive, with flat skull and somewhat square muzzle; ears small, and lying close to the head; coat straight and dense, and capable of resisting water; tail carried gaily, but not curled over; feet and legs large and muscular, and the former flat; eyes dark, small, and bright, deeply set, but not showing the haws; mouth capacious, with level teeth. A

among them George Wither, Daniel Defoe, Jack Sheppard, Titus Oates, William Penn, and others who figure in the Newgate Calendar. After 1877 Newgate ceased to be used as a place of incarceration. After 1868 executions took place inside its walls, until it was finally demolished in 1904, to make room for the Middlesex sessions-house. See Griffiths's The Chronicles of Newgate (1884), and Gordon's Newgate (1903).

New Granada. See COLOMBIA. New Guinea, the largest isl. on the globe after Australia, from which it lies N. It is divided politically between the Netherlands (w.), Germany (N.E.), and Great Britain (S.E.). Its interior is mountainous, though as yet but lian forms like eucalyptus, and alpine, such as rhododendrons. The mammalia is acanty, and composed chiefly of marsupials. The birds are extremely numerous. The chief exports are bêche de mer, copra, ebony, sandalwood, india-rubber, earthenware, pearls, sago, and alluvial gold. The mineral wealth is as yet little explored. Holland annexed the W. half in 1848, Germany the N.E. in 1885; this forced the British to proclaim a protectorate over the S.E., which had been annexed the year before by Queensland. In 1888 it was proclaimed a British colony. The inhabitants of New Guinea belong to the Melanesian division, and are usually classed under the

name of Papuans Many tribes, but by no means all, indulge in head-hunting and cannibalism.

DUTCH NEW GUINEA has never been wholly explored or conquered, and the Dutch have contented themselves with trading stations—e.q. Doreh—on the coasts, leaving the country under the nominal suzerainty of the sultan of Tidore. Its area is

BRITISH NEW GUINEA contains some of the poorest soil. It extends over about 90,000 sq. m. and has a population of about 350,000. The chief ports are Samarai and Port Moresby, the capital (pop. about 1,500). In 1904 the exports were £75,506, and the imports £76,631.

See Wallace's Malay Archipelago (new ed. 1891); Forrest's Voy-



New Hampshire.

Parthaloner Li

estimated at 152,000 sq. m., with a population of over 200,000.

GERMAN NEW GUINEA is governed by a trading company, and the chief settlements are Astrolabe Bay, Friedrich Wilhelm Hafen, and the unhealthy Finschhafen. It has a population of about 110,000. Area about 70,000 sm. See also KAISER WILHELM'S LAND,

age to New Guinea (1779); Lindt's Picturesque New Guinea (1887); Chalmers's Pioneering in New Guinea (1887), and Work in New Guinea (1885); Romilly's The Western Pacific and New Guinea (1886), and From my Verandah in New Guinea (1889); Codrington's The Melanesians (1891); Thomson's British New Guinea (1892); Webster's Through New

Guinea (1898); and Haddon's Head-Hunters (1901).

New Hampshire, N.E. state of U.S.A., with an area of 9,005 sq. m. It was one of the thirteen colonies and original states of the Union. Its surface is largely mountainous or hilly. The White Mountains in the N. reach in Mount Washington 6,293 ft. The state has a short stretch of seacoast in the S.E., with Portsmouth as its only seaport. The chief rivers are the Connecticut, the Merrimack, and the Androscoggin. Except where it has been cleared for cultivation, the land is wooded. The capital is Concord, and the largest city Manchester. The principal products are hay, po-tatoes, corn, vegetables, and or-chard fruits. The manufactures are extensive, the chief products being boots and shoes and cotton goods. Pop. (1900) 411,588, ton goods. of whom 49'9 per cent. were males and 50'1 per cent. females.

New Harmony, co. tn. of Posey co., Indiana, U.S.A., on Wabash R., 15 m. N. of Mount Vernon; has flour mills and brick works. In 1805 the Harmonists (a German communistic religious body on the model of the prinitive church) came to settle there from Harmony in Pennsylvania. Owing to opposition the settlement was broken up. From 1824-7 it was occupied by Robert Owen's community. Pop. (1900) 1,341

community. Pop. (1900) 1,341.

Newhaven. (1.) Scaport at mouth of Ouse, Sussex, England, 9 m. E.S.E. of Brighton. The harbour is enclosed by two piers and a breakwater 2,700 ft. long. The continental route vià Dieppe is extensively used, and considerable trade is carried on with French ports. Total value of port trade in 1905, £15,705,617 (£12,663,732 imports). Pop. (1901) 6,772. (2.) Fishing village, Midlothian, Scotland, on Firth of Forth, I yn. w.N. w. of Leith; dates from 1488. The former quaint redtiled houses with outside steps are rapidly making way for modern tenenents; the fishwives still retain their picturesque dresses and creels. See Charles Reade's Christic Johnstone. Pop. of eccles, par. (1901) 7,636.

cccles. par. (1901) 7,636.

New Haven, city, Connecticut, U.S.A., and co. seat of New Haven co., on a good harbour on Long Island Sound. It is a beautiful place, and is the seat of Yale University, founded in 1701. New Haven is the chief manufacturing city of Connecticut, the products being very varied. Pop. (1900) 108,027.

New Hebrides, archipelago of 20 isls. in Pacific, extending over 500 m. N. to s., between 13° and 20° s. and 166° and 170° E. They are under a mixed commission of English and French naval officers on Pacific stations. Total area,

5,000 sq. m. Among the larger islands are Espiritu Santo (75 by 40 m.), Malikolo (55 by 20 m.), to the s.E. of it, Sandwich, Api, and Pentecost. In the N. part are Banks Islands. The islands are volcanic, and free from coral reefs. The temperature ranges between 58° and 90′ F., and the climate is unhealthy for Europeans. There is a heavy rainfall. The rich soil, densely wooded, grows sago palm, breadfruit sugar cane, arrowroot, yam, and coffee. The chief exports are copra, bananas, and coffee. There is also a trade in sandalwood, india-rubber, and tortoise-shell. Exports (1904), £43,000; imports, £54,800. There is regular steamer communication with Sydney and with New Caledonia. tives are mostly Melanesians, with a few Polynesian groups. Discovered by Quiros (1606). Native pop. about 109,000; European, 400. See Lamb's Saints and Sacages (1905).

New Holland, a former name of Australia.

New Iberia, tn., Louisiana, U.S.A., co. seat of Iberia par., 120 m. w. of New Orleans. Pop. (1900) 6,815.

New Ireland. See BISMARCK ARCHIPELAGO.

New Jersey, N.E. state of U.S.A., with an area of 7,525 sq. m. It was one of the thirteen colonies and an original state. The N, is intersected by ridges of the Appalachian system. The S. the Appalachian system. is a plain sloping gently towards the Atlantic and Delaware Bay. On the Atlantic coast is a line of sand-bars, behind which are lagoons and marshes. Except where it has been cleared for cultivation, the land is wooded. The capital is Trenton. The agricultural interests are secondary to the manufacturing and commercial, and agriculture has become almost wholly market-gardening. The principal industries are the manufacture of silk goods, foundry and machine-shop products, petroleum - refining, iron and steel, malt liquors, leather, chemicals, and tobacco. Cotton and woollen goods are also manufactured. Iron ore is mined in the N. Pop. (1900) 1,883,669.

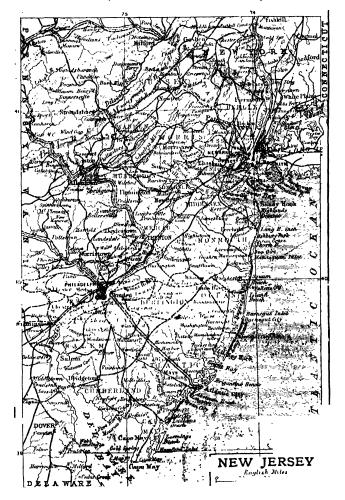
New Jerusalem Church. See SWEDENBORG.

Newlands, JOHN ALEXANDER REINA (1838–198), English chemist, was a pupil of Hofmann, and from 1865 practised asan analytical and consulting chemist. His great discovery was that the properties of the elements vary periodically with their atomic weights, and though scornfully received when enunciated as the Lamof Octares, this was afterwards developed by Mendeléeff and Lothar Meyer. Newlands was honoured by the Davy medal of the Royal Society.

New London, city, Connecticut, U.S.A., co. seat of New London co., at mouth of Thames R., 45 m, E. of New Haven. It manufactures silk and woollen goods, and carries on fishing. Pop. (1900) 17.548.

Newman, FRANCIS WILLIAM (1805-97), English scholar and man of letters, younger brother of Cardinal Newman, was born in

anonymously in 1847 a History of the Hebrew Monarchy; in 1849, The Soul, her Sorrows and Aspirations; and in 1850 his best-known work, Phases of Faith, or Passages from the Histor; of my Greed, to which his brother's Apologia, fourteen years later, formed a curious counterpart or contrast. Francis was a theist, in sympathy with almost every movement of



London. Through conscientious scruples he resigned his fellowship at Balliol, Oxford, in 1830, and joined a Baptist mission at Bagdad. In 1833 he returned to England, and undertook educational work, first at Bristol (1834), then at Manchester New College (1840); from 1846 to 1869 he was professor of Latin at University College, London, He wrote

free thought, and as versatile as he was eccentric. He was one of the many translators of Homer. Among his latest productions was a singularly unreticent monograph upon his brother.

Newman, JOHN HENRY (1801-90), English cardinal, was the eldest son of a London banker. In 1828 he was appointed vicar of St. Mary's, Oxford, His estrange.

ment from the evangelical school may be dated from this period. He was vice-principal (1825) of St. Alban's Hall, under Whately.

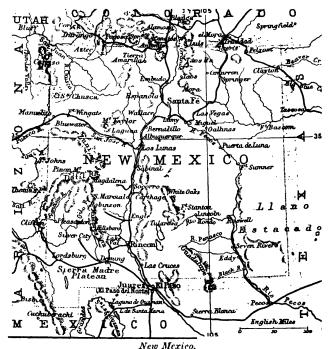


Cardinal Newman. (Photo by Walker & Cockerell, from the painting in the National Portrait Gallery.)

After resigning his tutorship at Oriel, he went to the south of Europe with Hurrell Froude; and after a fever in Sicily, returned to England with a deepened conviction that he had a mission to revive the Catholic spirit in the Anglican Church. On his way home he wrote the hymn, Lead, Kindly Light (1833). Tracts for the Times were started by Newman in 1833, with the assistance of others, including after a time Dr. Pusey. In conjunction with Newman's deliverances at St. Mary's, these made a great impression. Newman began to have nisgivings as to the via media, as it was called, partly through his own studies, partly through an article by Wiseman (afteran article by Wiseman (afterwards cardinal) in the Dublin Review on 'The Anglican Claim.' Eager for a reconciliation between the Roman and Anglican Churches, he made in Tract 90 (1841) a feverish effort to show that the Thirty-nine Articles were directed only against the popular errors of Romanism, and were to be interpreted, where necessary, in a sense other than that intended by their compilers. Amid the excitement and repro-bation which this tract occasioned, Newman retired (1842) to Littlemore, where he had established a small religious community, and there he completed his Essay on the Development of Christian Doctrine. In 1843, after resigning St. Mary's, he retracted his adverse

pronouncements against Rome, and in 1845 was formally received into the Roman Catholic Church. As a Roman priest and an Oratorian, he settled for a long time at Edgbaston, near Birmingham, establishing the Oratory there (1847), and the London Oratory (1850). In 1854 he was appointed rector of the new Catholic University at Dublin. In this position he published his Idea of University and Lectures on University Subjects (1854-8). Kingsley, in Macmillan's Mayazine (Jan. 1864), asserted that 'Father' Newman declared that truth need not and ought not to be a virtue in the Roman clergy. To Kingsley's imperfect apology for this Newman retorted in a brief pamphlet, in which he summarized the correspondence with a satirical power to which there had been no parallel in theological literature since Pascal's Provincial Letters. Stung to the quick, Kingsley retorted with, What then does Dr. Newman mean? (1864); but he had been entrapped into a blind but honest onslaught against a skilful fencer, who had long been waiting for some such attack. Newman's reply was the

life;' and in the same year openly discouraged that definition by the Vatican Council of 'papal infallibility' which, when promulgated, he accepted. Leo. XIII. made Newman a cardinal (1879). After this his most noteworthy production was an article in the Nineteenth Century (1884), in which he betrayed an unexpected tolerance of modern Biblical criticism. Newman, like Pascal, had the intellect of a sceptic, and the soul almost of a mystic. Like Pascal, too, he could put the doubts and misgivings of humanity in their most telling form. His finger was on the pulse of the religious world, and he could interpret its symp-toms. The fascination of his style has attracted to him readers little interested in the questions which vexed him. As a Christian poet he ranks high; his contributions to Lyra Apostolica and his Dantesque poem the Dream of Gerontius are perfect in expression. See his Letters, edited by Miss Mozley (1891); Cardinal Neeman, by W. Barry (1994), and by Waller and Burrow (1902); and Nevillo's Addresses to Cardinal Monarca (1881). dinal Newman, with his Replies, etc., 1879-81 (1905).



Apologia pro Vità Sua (1864; ed. 1904). In 1870 he published his Grammar of Assent, a logical development of the Butlerian theory of 'probability as the guide of

Newman Memorial, an annual prize conferred on the engineer student who, entering the navy, obtains the highest number of marks for practical engineering.

The foundation is in memory of Edward Newman, chief engineer at Portsmouth deckyard.

Newmarket, mrkt. tn., Suffelk, England, 13 m. E.N.E. of Cambridge. It is noted for horse races held in April, May, July, and October; and here from 1,500 to 2,000 horses are usually in training. The Jockey Club has extensive premises, and the Astley Institute was opened in 1877 for men connected with the stables. Crossing the Heath, about 1½ m. w. of the town, is the ancient intrenchment called the Devil's Dike. Pop. (1901) 10,688.

New Mexico, territory in w. of United States, with an area of 122,460 sq. m. It was organized as a territory in 1850. A bill passed (1906) the House of Representatives providing for the admission of New Mexico and the territory of Arizona as a state, but it was thrown out by the Senate. The E. consists of treeless plains, rising to mountain ranges in the middle, while the w. is composed mainly of plateaus. The Rio Grande traverses it from N. to S. near its middle, and the E. is crossed in the same direction by the Pecos, a branch of the Rio Grande. The capital is Santa Fé. The grazing interest is large. Flour-milling and lumber are the largest industries. Coal and lead are found. Pop. (1900) 195,310.

Newmilins and Greenholm, police bur., Ayrshire, Scotland, on river Irvine, 18 m. N.E. of Ayr, with manufactures of muslims and laces, and remains of an old castle. Pop. (1901) 4,466.

New Model, the name applied to the army of the Parliament after its reorganization in 1645 on the model of Cromwell's famous regiment of Ironsides. It was then placed under the command of Sir Thomas Fairfax, butit was soon found necessary to place Cromwell under him as lieutenant-general. Naseby (1645) was the first triumph of the New Model.

Newnes, Sir George (1851), English publisher, was born at Matlock, Derbyshire. His first great success was the starting of Tit-Bits in 1881. His other newspaper enterprises include the Westminster Gazette (founded on Jan. 31, 1893), the Strand Magazine, the Wide World Magazine, the Sunday Strand, the King and his Navy and Army, Country Life Illustrated, the Ladies Frield, Woman's Life, Fun, the Home Magazine, the Captain, C. B. Fry's Magazine, and the Grand. He entered Parliament in 1885, and sat as a Liberal for the Newmarket division till 1895. He re-entered the House of Commons in 1900 as member for Swansea, Created baronet, 1895.

Newnham College, for women, Cambridge, was opened in 1875. The students are required to pass an entrance examination or its equivalent, and then usually read for honours in the degree examinations of Cambridge University. There are a number of resident women tutors; the students, who number about 160, take advantage largely also of the teaching of the university.

New Orleans, city and scapt.,

New Orleans, city and scapt., Louisina, U.S.A., on l. bk. of the Mississippi, 106 m. from its mouth. The site is so low as to be below the river when the latter is in flood, and levees have been constructed to protect the city from inundation. Canal Street, which runs at right angles to the river bank, separates the city into two distinct parts—the modern American portion and the ancient French city. There is a cathedral, erected in 1794; here also is Tulane university (1834). Although in the main a commercial centre, New Orleans has extensive manufacturing interests, the

manures, shipbuilding, and brew-A transporter bridge over ing. A transporter bridge over the Usk is one of the first two of the kind erected in Great Britain. Docks cover about 70 ac., and 86 ac. are (1906) being added and other port improvements made; coal, iron, and steel are exported, their value in 1905 amounting to £3,411,794, the total trade amounting to £5,182,843. The ancient Caerleon is 3 m. N.E. Some remains exist of a Norman castle. Important discoveries have been made of Roman remains. Pop. (1901) 69,290. (2.) Municipal bor., Isle of Wight, England, 18 m. s.s.r. of Southampton. The free grammar school dates from 1619: and here Charles I. signed the treaty of Newport. About 11 m. to the s.w. are the ruins of Carisbrooke Castle, where the king was held prisoner. The Gatehouse, restored as a memorial to Prince Henry of Battenberg, has a museum containing local antiquities and Stuart relics. Pop. (1901) 10,911. (3.) Market tn., Shropshire, England, 17 m. E.N.E. of



New Orleans and Environs.

principal product being refined sugar. Its imports reached £7,116,022 in 1905, and its exports were £28,870,401. More than half of this amount consists of raw cotton, and the remainder is made up of Indian corn, wheat, tobacco, and cotton-seed oil. Laid out in 1718, it became the capital of French territory in 1722. During the civil war it was an important Confederate centre until captured in 1862. Pop. (1900) 287,104. See G. W. Cable's Old Creole Days (1879).

New Plymouth, chief tn. and port of Taranaki provincial dist., on W. coast of North Island, New Zealand, 120 m. s.w. of Auckland. It exports butter, cheese, bacon, 1201/1407.

and hams. Pop. (1901) 4,407.

Newport. (1.) Municipal and co. bor., Monmouthshire, England, 12 m. N.E. of Cardiff, on the Usk, 4 m. from its mouth. It includes Maindee, and forms part of Monmouth parl. dist. The church of St. Woollos dates from the Saxon period. Manufactures include steam-engines, railway material, agricultural implements, glass, pottery, chemical

Shrewsbury. The church of St. Nicholas has been rebuilt. Agricultural implements and machinery are manufactured. Pop. (1901) 3,241. (4.) City, Campbell co., Kentucky, U.S.A., on the Ohio, opposite Cincinnati. Manufactures watch cases, cast-iron pipes, and sheet iron. Pop. (1900) 28,301. (5.) City and summer resort, Rhode I., U.S.A., co. scat of Newport co., 25 m. s. of Providence. Pop. (1900) 22,034.

Newport News, city, Virginia,

Newport News, city, Virginia, U.S.A., on Chesapeake Bay, 13 m. N.W. of Norfolk, across the James R. It has a fine harbour and excellent shipping facilities. Its chief industry is shipbuilding.

Pop. (1900) 19,635.

Newport Pagnell, mrkt. tn., Buckinghamshire, England, on the Great Ouse, 14 m. N.E. of Buckingham. The church dates, in part, from the time of Edward III., and Queen Anne's Hospital from the 13th century. Pop. (1901) 4,028.

New Providence. See BA-

New Red Sandstone, See TRIASSIC,

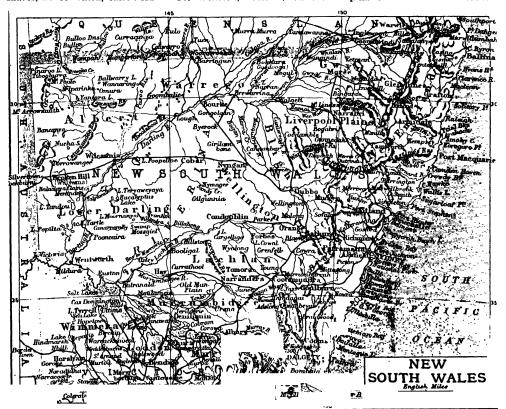
New River, artificial channel, originally 40 m., but now only 27 m. long, conveying water from the springs of Chadwell and Amwell, in Hertfordshire, England, and from the Lea, to N. London. The work was undertaken in 1609 by Hugh Myddelton, a goldsmith of London, and in 1613 the New River Head reservoir at Clerkenwell was opened. The principal reservoirs near London are at Stoke Newington (42 ac., holding 92,000,000 gallons). The property was divided into 72 shares, 36 of which, called Ad-

original shares, and for the 5,000 new shares (of a nominal value of £100 each), the New River Co. were awarded £6,534,000 of 3 per cent. water stock, and were in addition allowed to retain certain property, estimated at nearly half a million, unconnected with the water undertaking.

New Rochelle, city, Westchester co., New York, U.S.A., 18 m. N.N.E. of New York city, of which it is a suburb. Pop. (1900) 14,720.

New Ross, tn. and river port, Co. Wexford, Ireland, on the height of 1,200 ft. The principal are New Siberia, Kotelnoi, Bennett, Fadeyer, and Lyakov. Reinder are pastured; many mammoth tusks have been collected, and remains of rhinoceroses and buffaloes.

New South Wales, the oldest state of the Commonwealth of Australia, between 28°10′ and 37° 28′ s., and 141° and 153° E. The Pacific coast-line is over 700 m. long, and the breadth from the Pacific to the 141st meridian averages 500 m. Area, 310,700 sg. m. The chief natural feature



venturers' shares, were held by Sir Hugh Myddelton and 28 other persons, the remaining 36 shares being made over to the king in return for his assistance; but these Charles I. relinquished in 1631 for an annuity of £500. The Adventurers' shares have since been several times subdivided. In 1634, shares were worth only £3, 4s. 2d. each; in 1897 a share was sold for £125,500. The undertaking of the New River Co. was transferred in July 1904 to the new Metropolitan Water Board. For the 72

Barrow, 2 m. below the confluence of the Nore. An iron bridge connects it with the Kilkenny suburb of Rosbercorn. Pop. (1901) 5,847.

Newry, seapt., munic. and parl. bor., Co. Down, Iroland, near head of Carlingford Lough, 38 m s.s.w. of Belfast. There are flax-spinning and corn mills, and stone quarries. Large vessels are betthed at the Victoria Locks, 3 m. below the town. Pop. (1901) 13,623.

New Siberia Islands lie N. of

New Siberia Islands lie N. of the mouth of the Yana, Siberia. They culminate in Kotelnoi at a is the Main Dividing (or Cordillera) Range, which traverses the country from N. to S. and averages 2,500 ft. but in Mount Kosciusko reaches 7,308 ft. and in Mount Townsend 7,260 ft. In the west of the state there is another mountain system, of which the Barrier and the Grey Ranges form part. The highest peaks are Mount Arrowsmith and Mount Lyell (2,000 ft.). The rivers of the interior are the Murray, Murrumbidgee, Darling, and Lachlan. Norfolk I. and Lord Howe I. belong to this state.

Many seams of valuable coal are worked, the Newcastle series being the most important. Vast quantities of water are stored in the Cretaceous formation underlying the whole of the N.W. portion of the state. Artesian boring was commenced at Killara station in 1879. At the end of 1899 there were seventythree completed government bores. Of these, forty-eight bores. Of these, forty-eight yield about 30,000,000 gallons per day; from sixteen smaller bores 750,000 gallons per day can be pumped. The deepest bore is Dolgelly (near Moree), 4,086 ft. yielding 745,200 gallons per day. At many of these bores the government has established irrigovernment has established irrigation farms. Gold reefs have been worked in New South Wales since 1851. Copper-mining reached its highest productive point in 1883. Tin occurs. Iron is widely diffused. Anti-mony, bismuth, and chromium have also been won. The other minerals worked include man-ganese, platinum, mercury, co-balt, and wolfram. Diamonds, sapphires, emeralds, rubies, and opals are found. The state possesses inexhaustible deposits of marbles, building-stones, fireclays, and slates. On the coastal regions the difference between the mean summer and mean winter temperatures is 24. The dry heat of the interior and western plains is illustrated at Bourke, the mean winter reading of which is 54 5°. The coastal district has an average rainfall of 4173 in.; that of the tablelands is 3272 in.; of the whole country (forty-five years), 49'43 in. Over a large area west of the Darling the average annual rainfall is only 10 in.

New South Wales is essentially a pastoral country. The area occupied for agricultural and pastoral purposes is 162,323,133 acres; the area under cultivation is only 2,568,000 acres. Tobacco has increased in acreage and denas increased in acreage and decreased in yield per acre of recent years. The areas under sugar-cane show great increase yearly. In 1905 the yield of wine amounted to 928,160 gallons. The export trade in fruits is increasing. Among the timber trees are the red gums and apple trees of the northern river flats, and the white iron bark, the blackbutt, the white mahogany, the tallow wood, the spotted gum, gray box, and varieties of gray and blue gums on the ridges and mountain slopes. On the north-ern rivers are brush forests of tall fern-trees, palms, cabbage-trees, the red cedar, the red bean, the beech, and brown pine. Other important products of the brush

forests are teak, cudgerie, red ash, and corkwood.

Of the population, 72 per cent. are Australian born, 234 per cent. were born in the United Kingdom, and 34 per cent. were foreign born. The population (1901) was 1,359,943, including 7,434 aborigines and 10,974 Chinese; (1906), 1,504,700. Wool-growing, cattleraising, and meat-freezing are stable industries. The more important manufactures are clothing and textile fabrics, metal works and machinery, and books and printing. The most impor-tant port is Sydney; next in The most imporimportance are Newcastle and Wollongong. The total imports for 1905 were valued at £29,431,828, and the total exports at about £37,000,000. Nearly the whole of the railways are state property, and have a total length (1905) of 3,280 m. The Sydney mint produces gold coinage only; from 1855 to 1904 it issued coin to the value of £109,633,243. The average yearly coinage is £3,250,000. The government is administered by two houses of parliament, of which the Assembly is elected by the people. By an act assented to in 1903, the franchise was extended to women. The Legislative Council is a nominee house, its members being appointed for life. The Assembly has 125 members. Parliaments are triennial. New South Wales contributes £40,000 a year to the upkeep of the Australian fleet. There is no church establishment. Of the people professing religious beliefs in 1901, 502,890 were Church of England, 286,911 Roman Catholic, 109,390 Presbyterian, 110,112 110.112 Wesleyan and other Methodist, and 24,112 Congregationalist. Primary education is compulsory, secular, and practically free. For secondary education there are high and superior schools entirely supported by the state. similar institutions partially supported by the state, and some denominational colleges and grammar schools. Sydney University is liberally endowed by the state. Botany Bay was discovered by Captain Cook in 1770, and in 1788 the first convict fleet arrived

in New South Wales. The transportation ceased in the early fifties of the 19th century. In 1856 responsible government began. The Chinese Immigration Restriction Act came into force in 1862. From 1859 until 1875 the back country districts were terrorized by bushrangers, who committed many murders and robberies. In 1891 the trade unions secured the return to Parliament of thirty labour members. This inaugu-rated democratic legislation in Australia. The fiscal policy of New South Wales, which had up to that time savoured of free trade. became protectionist with the accession of the Dibbs ministry. In 1893, the state, in common with the other Australias, suffered a

financial panic.

New South Wales Government Railway, the first railway in New South Wales, was commenced in 1851, under the title of the Sydney Tranway and Railway, and was followed by the Hunter River Railway from Newcastle to Maitland. In 1855 the government took over the two properties. The line from Sydney to Parramatta (14 miles) was opened in September 1856. The present railway system comprises the Southern Line, extending from Sydney to Albury, 386 miles; the Northern Line, from Sydney to Jennings, 490 miles; and the Western Line—the total mileage in operation at June 30, 1905, being 3,280. The total capital expended on construction has been £43,062,550, and the net earnings in 1905 were £2,112,807. The gauge is 4 ft. 81 in.

The Courant, Newspapers. or Weekly News from Foreign

Parts, confessedly translated from the Dutch, and published by Nathaniel Butler, is the first example of a newspaper that has come down to us. It bears date Oct. 9, 1621, and, with intermissions, was continued for twenty years. In 1643 the Long Parliament passed an ordinance forbidding the publication of any book, pamphlet, or paper, unless li-censed by the authorities which Parliament appointed. In 1655 Cromwell proclaimed that 'no person whatever do presume to publish in print any matter of public news or intelligence without leave of the Secretary of State.' After the restoration a stringent Licensing Act was in force from 1662 to 1695. During the protectorate and the reign of Charles II. two papers only were issued with authority -the Parliamentary Intelligencer and Mercurius Publicus, whose titles were changed from time to time. Other papers, however, managed somehow to appear; and to discourage this defiance of authority, one printer, named Twyn, was hanged, drawn, and quartered in 1663. Another official organ, the London Gazette, appeared in 1665, and still continues. After the deposition of James II. papers multiplied rapidly. In 1704 appeared Defoe's Review; this, before a year had elapsed, was produced thrice a week, and by its style and character marked a great departure from all its predecessors. Two years earlier the first attempt at daily journalism had been made by the production of the Daily Courant; but this paper consisted only of cuttings and translations from the foreign

press. In 1709 there were eighteen separate papers published in London, notable among them being Steele's Tatler, which appeared thrice a week, and which in 1711 was succeeded by the non-political Spectator. In 1710 appeared the Examiner, as the organ of St. John and Harley, with such contributors as Matthew Prior, Dr. Atterbury, Dean Swift, and the notorious Mrs. Manby, The venomous tone of the press in those days was its principal characteristic, and almost justified the act of ministers in imposing, in 1712, a stamp duty on newspapers by way of restric-tion. The duty was one half-penny for each half-sheet and one penny for a whole sheet, together with a tax of a shilling on each advertisement. The immediate effect was to kill many of the smaller papers. Any allusion to the proceedings of Parliament, or to the members of either house, was highly resented by Parliament at this time; and both Lords and Commons freely fined and committed indiscreet publishers, and even the lord mayor imitated their example. Walpole preferred, however, to spend large sums of money in buying the support of papers or of writers connected with them. In the early part of the 18th century Defoe, Swift, Addison, Steele, Johnson, Fielding, and Smollett all devoted much of their energy to newspaper writing -Johnson writing accounts of the debates in Parliament for the Gentleman's Magazine, and Fielding, between 1739 and 1746, editing no fewer than three papers. It was the production of the Briton in 1762, with Smollett as editor, as the champion of the hated Bute administration, which induced John Wilkes to take to journalism. Wilkes started, with Churchill, the North Briton (1762) as the vehement and uncompro-mising enemy of Lord Bute and his government. Expelled from the House of Commons again and again, imprisoned, fined, and even outlawed, Wilkes maintained the fight for freedom of the press for ten long years; and in the end he triumphed. Another landmark in the history of journalism was the appearance in 1769 of the Letters of Junius' in the Public Advertiser. Another surrender to the growing influence of the press was made (1774-89) when William Woodfall, the proprietor of the Morning Chronicle, persisted in regularly and fully reporting the proceedings of both houses of Parliament. Before this, however, though in the same cause, Lord Mayor Crosby and Alderman Oliver had been committed to the Tower (1771) by the order of the House of Commons. But since that time no attempt has been made to punish the publication of parliamentary reports.

The stamp duty and advertisement tax were doubled in 1757; and in 1776 the stamp duty was raised to three-halfpence. At the same time the publishers of newspapers were harassed by vindictive prosecutions, involving fine and imprisonment, for libel, whenever anything was published disagreeable to the ministers of the day or to those having influence in high places. In 1792 the law of libel was amended, but only as far as to secure for the accused the fair trial which a ruling of Lord Mansfield had made impossible; and the immediate result of the new act was to make the press prosecutions more numerous than before. Further oppressive measures were resorted to in 1797, when the stamp duty was increased to threepence. The advertisement tax had been raised to 2s. 6d. in 1789. In 1804 the stamp duty was raised to threepence-halfpenny, and the advertisement tax to 3s. 6d.; and in 1815 the stamp duty was raised to fourpence, the highest point

which it ever reached.

The Times was founded in 1788, its principal rival being the Morning Chronicle, in connection with which Perry irst perfected the present system of parliamentary reporting. Both Perry and Walter, the proprietor of the Times, were fined and imprisoned. The heavy stamp duty made it necessary to charge at least seven pence for a daily paper. Newspapers were not only violently partisan at this time, but unconscionably scurrilous and vituperative in their language, and not until the 19th century was well advanced did they wholly throw off this habit. A distinctly higher tone was set by John and Leigh Hunt in the Examiner, a weekly paper founded by them in 1808. But the attitude of the governing classes towards newspapers was well shown by the prosecution of the Hunts for seditious libel, for saying that of all monarchs since the revolution the suc-cessor of George III. will have the finest opportunity of becoming nobly popular. Another prosecution, equally abortive, followed in 1810, for an article against flogging in the army; but more excuse for official resentment was provided two years later by Leigh Hunt's immortal piece of invective against the prince-regent. The Hunts were sent to prison for two years; but in the three years preceding their prosecution not less than fortytwo other press prosecutions were entered.

With the beginning of the

reign of Queen Victoria, how-ever, the days of prosecution for seditious libel came to an end. The right to publish reports of cases in the law courts and po-lice courts was next extorted. Henry Hetherington, in 1830, in open defiance of the law, brought out his Poor Man's Guardian as an unstamped penny weekly. For this he went to prison; but in the end he secured a relaxation of the law in favour of weekly papers of the type of the Poor Man's Guardian, which itself was continued as the Weekly The political agita-Disputch. tion against the stamp duty took serious form in 1849, when Mr. Milner Gibson took up the matter. The advertisement duty had been lowered to 1s. 6d. in 1833; and three years later the stamp duty had been reduced to a penny, while the paper duty was fixed at three-halfpence a pound. The result had been to decrease the price of the papers from sevenpence to fivepence a copy, and to increase the circulation at a bound three or four fold. At length, in 1853, a motion calling for the repeal of the advertise-ment tax was carried against the government of the day. years later the stamp duty was abolished, and in 1861 the last of the burdens on newspaper enterprise—the paper duty—disappeared.

The immediate consequence of this was the springing up of daily newspapers all over the country. With the development of the daily press came a new impulse to weekly journals of all kinds, and the sectional and class papers which began to appear in the 'forties were multi-plied many times in numbers in circulation. But the mechanical difficulties of printing a great issue, and the impossibility of distributing it, confined all but the leading papers to a very narrow circulation. The *Times*, with a circulation of 50,000, largely exceeded all its contemporaries. The introduction of the steam-press by John Walter in 1814 was the first great advance made; and the next was the adoption of the Hoe rotary machines in the early forties, followed twenty years later by the Walter press. It now be-came possible to print editions of 100,000 or more; and the building of the railways solved the difficulty of distribution, and greatly facilitated the collection of news. But in this last respect a still greater influence was exerted by the establishment of the electric telegraph. The only serious disadvantage remaining was removed when the tele-graphs were taken over by the Post Office in 1868. Facilities for

telegraphic intercourse produced the news agencies. The first to come into the field was Reuter's, by which news of the principal events abroad is supplied to newspapers at an annual subscription. In 1868 and 1870 respectively the Central News and the Press Association were founded. Further improvements in printing machinery, and the invention of the type-composing machine, have so far increased the rapidity of mechanical production that the issue of editions of half a million is now an accomplished fact; and to attract so enormous a public, a further reduction in the price of newspapers from a penny to a halfpenny has been in progress during the last ten years. The London Farthing Post, which only lived by evading the stamp duty, was started in 1718, and the first halfpenny paper—the Leho—appeared in 1868; while a halfpenny morning daily—the Northern Echo—was first issued in 1869. The latest development of daily journalism is in the direction of illustration. An illustrated daily paper—the Daily (Teaching and Daily 1991). Graphic-was produced in 1890, and since then nearly all the great dailies have adopted, more or less regularly, illustrations bearing on the events of the hour.

In the early days of newspapers the difficulty was to find news enough to fill the tiny and intermittent sheets that then appeared. Nowadays the principal function of a large editorial staff is to squeeze into the space available the huge volume of intelligence with which day by day every newspaper is over-whelmed. In the first place, there are the claims of the advertisements, which must always be the life-blood of any self-support-ing and competitive press. These ing and competitive press. These are dealt with in all large newspaper offices by a special department, which is strictly extraeditorial. The matter which fills the columns not devoted to advertisements may be divided into nine classes-editorial comments, official announcements special articles and correspondence, for-eign news, political news, law and police reports, city news, sporting intelligence, and general home news. When the events are local or of exceptional importance, newspapers send their own representatives to report the proceedings. In other cases, reports are supplied by local correspondents or by the news agencies; and the tendency is more and more for the agencies to supplant the local correspondents. Special rates for press messages are granted by the Post Office. The financial news and sporting news are generally dealt

with by special departments— most of the leading papers hav-ing city offices and city editors of their own. The city editor's duty is to write a review of the state of the money market and the tendencies of the stock exchange, to give the latest prices of stocks and shares, and to comment on the salient commercial and financial transactions of the day. The trade returns may or may not be dealt with by the same person. The sporting editor looks after the racing news, cricket, football, golf, and all other sports. There is a special agency devoted to the reporting of sporting events, and through this most of the newspapers derive their sporting news. In regard to law reporting, the agencies are the source of supply for nearly all papers out of London: some of the metropolitan papers are served by a special corps of law reporters, or, as in the case of the Times, by their own represen-tatives. In respect of political news, which includes the debates in Parliament, intelligence from the lobby, and the reports of political speeches, the agencies again cover the whole ground for an increasing number of newspapers. But most journals to-day supplement or almost displace their report of the parliamen-tary debates by a 'Parliamentary Sketch, and many of them have a lobby correspondent of their own. Many of the great newspapers in London and the country have their own special correspondents in the important capitals of the world, and some, like the Times, have a private wire to Paris; but even then the special telegrams only supplement those of Reuter. During the South African war most of the newspapers who had special correspondents at the front sought to mitigate the great burden of the expense by forming groups which shared the news and the cost of procuring it. Distinct from news strictly so called are the special articles which occupy a large place in every modern newspaper. They include dramatic and musical criticism. literary reviews, and the communications of special correspondents on events of the day, or on questions which may be the subject of inquiry or agitation. Reviews of new books now occupy a considerable place in daily journalism, and some morning papers issue from time to time special literary supplements. Finally, there is the news supplied from official sources, such as the London Gazette and the government departments - appointments and promotions in the church or the services, regulations of the War Office, and Admiralty orders.

The sub-editors usually begin the immense labour of sifting and preparing the pile of copy awaiting attention at four or five o'clock in the afternoon. structions having been received from the editor as to space to be given to particular departments of news, the 'flimsies' of the agencies and the 'liners' and the 'copy' of reporters have to be adjusted to the required length. Everything has to be read, corrected, punctuated, marked for type, 'leads,' and so on, and given suitable headings, and even cross-headings. This labour demands the attention of a staff mands the attention of a staff of half a dozen sub-editors or more, even when the foreign and sporting news and other special branches of intelligence are dealt with by special depart-ments. Not the least anxious part of the sub-editor's duty is to see, first, that no important event is overlooked, and, next, that no 'do thle' or duplication of the same piece of news occurs in different parts of the paper. In the foreign department many of the messages of correspondents abroad have to be decoded; and most of them being only sent in skeleton, to save the expense of unnecessary words, have to be put into readable English. With With the whole contents of the paper the editor has to be familiar, and he or his assistant-editors have to read everything in proof, to see that nothing libellous or antagonistic to the tone or policy of the paper gets into print. Then he must decide not only what space is to be given to each item of news, but what subjects are fit for treatment in editorial leaders, and in what manner they shall be treated. There are the leader-writers to instruct, and their leaders to read, and modify if need be; and at the last moment there is always the possibility of news arriving which will quite alter the proportion-ate importance of events, or quite modify the view which has been taken of them.

When the modern printing press is set to work, 20,000 or more complete copies of a 16-page penny newspaper are not only produced per hour, but are folded and counted in piles of twenty-five. In the event of very important news arriving after the paper has gone to press, a stop-press edition is ordered.

Newstead, vil. and par., Nottinghamshire, England, 6 m. s. of Mansfield, and near Sherwood Forest. Newstead Abbey, founded by Henry II. in 1170 in penance for the murder of Becket, was granted by Henry VIII. to the Byron family, by the last of whom it was sold in 1818.

Newt, or Eff (Triton), a tailed amphibian, belonging to the same family as the salamander, but characterized by the strong compression of the tail, which is used as a swigmming organ. Most spe-cies spend a considerable part of the year on land. The diet congaris, the common or spotted newt; T. cristatus, the crested newt, which is less frequent than more than three inches, and has

the preceding; and the small T. palmatus, or webbed newt, which is rare in Britain. The common newt reaches a length of rather

Newts and their Development.

Warty newt, male.
 Fennale.
 Common smooth newt, male.
 Fennale.
 Details of development:—a, egg in glairy envelope;
 c, successive stages of progress within the envelope;
 e, the progress within the envelope;
 e, enlarge on leaving the envelope;
 e, f, larva at successive stages of development.
 to 6, natural size;
 7, enlarged.

sists of insects, worms, centipedes, snails, and so forth. At the breeding season the males often become brightly coloured, and in some in-stances develop a high crest along the ridge of the back. Newts are widely distributed, Europe being specially rich in species. Three species occur in Britain-T. vulan almost smooth skin. under surface is yellow or orange spotted with black, while the upper parts are brown or greenish, marked with black spots or stripes. At the breeding season the male has a glittering blue band along the side of the tail; and he has also a wavy crest.

which runs the whole length of the back, and terminates in the tail-fin.

There is no difficulty in getting newts to breed in confinement, and the larvæ are easily reared. The eggs are laid singly, each being carefully wrapped in the leaf of a water-plant. After about a fortnight the little tadpole emerges. At the time of hatch-ing it has on the head region two filaments, known as the claspers, by means of which it attaches itself to water plants; behind these are the simple gills, while still farther back appear the rudiments of the fore limbs. About three weeks after hatching the hind legs begin to appear, and the lungs become functional. About the same time the animal adopts a carnivorous instead of a vegetarian diet. As the lungs become more and more fully developed the gills diminish and become perfected, and in the early autumn the little newts leave the water, though remaining in damp places near its margin. The circulation of the blood may be seen in the gills of the larval newt as beautifully, and with much less trouble in the way of preparation, as in the classic case of the web of the frog's foot. The crested newt reaches a length of about six inches, and has a roughened skin, while the breeding male bears a prominent notched crest on the body. It is more aquatic in its habits than the common form. An interesting continental species is T. alpestris, which ascends the Alps to

New Testament, INTRO-DUCTION TO. There has been some discussion among scholars as to the nature of the prob-lem with which 'introduction' has to deal. Baur defines it as criticism of the New Testament canon. And that is true so far as it goes, but it unduly restricts the scope of the discipline. Schleiermacher seems to regard it as a kind of indefinite prolegomenon, 'intended to carry the present reader back to the standpoint of the first readers' (Weiss's Introduction, Eng. trans., i. p. 25). Such an intention falls undoubtedly within its aims, but the dcscription is too vague and general. Jülicher's terse definition appears to be more adequate: 'That branch of the science of literary history whose subject is the New Testament' (Einleitung in d. N.T., p. 1). But from its subject-matter as the record of the supreme revelation of God in history, the subject claims to be handled with great delicacy of treat-ment and self-restraint. The aim is to discover the origin of

the writings under discussion,

their authors, their dates, the occasion of their composition, the historical situation which formed their environment, and the purpose which they were intended to serve. These are questions of fact, of evidence. And the evidence must be collected from two main sources-partly from the documents themselves, and partly from the testimony of contemporary or subsequent writers. Where the documents are not the simple productions of separate writers, but composite works, incorporating various distinct sources within themselves, the task is to disentangle them; and this demands genuine insight into, and sympathy with, the spirit of the writing, as well as sobriety of judgment and an intellect trained in the weighing of evidence.

But the questions arising out of this task cannot be separated from that of the growth of the New Testament canon, the formation of the definite collection to which the name New Testament has been given. Some scholars go further, and include textual criticism within the sphere of this science. The criticism of documents may, however, easily degenerate into a dry and mechanical formalism. An adequate criticism of the historical facts must be regulated by an adequate conception of the spiritual movement which lies behind them.

History. - As far back as 200 A.D. a Roman theologian, Caius, questioned the apostolic origin of the Apocalypse; Origen re-fused to believe that the fused to believe that the Epistle to the Hebrews had been written by St. Paul; and the church historian Eusebius has handed down in his History (c. 324) a large collection of the opinions of earlier writers on the books of the Bible. The church of the middle ages was content to abide by tradition. At the reformation, although Luther incidentally expressed himself with great freedom on some of the New Testament writings, no systematic attempt was made in the way of a critical investiga-tion. The real founder of sciention. The real founder of scientific introduction was Richard Simon, priest of the Oratory in Paris. In 1689 he published his Histoire Critique du Texte du Nouveau Testament. Although his main subject is the text, he devotes a number of his opening chapters to the authenticity and chronology of the New Testament books. Throughouthe approaches his subject in the genuinely historic spirit. His work was continued by J. D. Michaelis, whose Einleitung in die göttlichen Schriften d. Neuen Bundes appeared in 1750, and in an enlarged edition in 1788. Michaelis examines the

tradition regarding each book with remarkable candour, and in some instances—notably that of the Epistle of Jude—with con-siderable boldness of criticism. He emphasizes the fact—and this is noteworthy-that the critical treatment of a New Testament writing need by no means affect or impair the validity of the Christian faith. But the first scientific investigation of the history of the canon was attempted by the Halle scholar J. S. Semler. In his Abhandlung von freier Untersuchung des von freier Untersuchung des Kanons (1771 5) he endeavours to distinguish between the permanent and the temporary elements in the New Testament writings, between the eternal revelation of God and those characteristics which belonged to the nationality, temperament, and training of the individual writers: J. G. Eichhorn, in his Einleitung in d. Neue Testament (ed. 1820-7), made somewhat hasty attempts to reach satisfactory combinations of facts. Of greater value was the Einleitung in die kanonischen Bücher des Neuen Testaments (1826) of De Wette, a scholar who combined great learning with a sane and sober judgment. Owing to its careful investigation of detail, this work may still be consulted with profit. As we approach more recent times we can only mention a few of the most noteworthy productions. K. A. Credner planned an elaborate introduction to the New Testament, of which only the first part appeared (1836). But a scheme similar to his was successfully carried out by the Strassburg professor, E. Reuss, in his Geschichte d. heiligen Schriften d. Neuen Testa-ments (revised ed. 1887; Eng. trans. 1874). Reuss, with great independence of judgment and lucidity of style, attempts an exhaustive historical treatment of New Testament introduction, embracing the history of the canon. of the text, of translations, and of exegesis. In some main respects he occupies a position akin to that of the Tübingen school. The leader of this school, F. C. Baur, dealt for the first time with the New Testament writings, not as the isolated productions of separate personalities, but as in-timately bound up with the early history of the Christian church, and reflecting the various phases of its development. In the application of his ruling conception, which he sought to establish by the most minute analysis of the New Testament books, he was led to extreme hypotheses, which have long since been proved un-tenable. He imagined that the church of the apostolic age was rent into two sharply opposed parties. The one, led by St.

Paul, stood for a universal Christianity, independent of the Jewish law; the other, supported by St. Peter and the original apostles, clung to all the characteristic prejudices of Judaism. The documents which reflect the former standpoint are the con-troversial epistles to the Galatians, Corinthians, and Romans, these alone being Pauline. The original Judaistic Christianity survives most clearly in the Apocalypse. Gradually, after the first generation of Christians had passed away, attempts at reconciliation were made, and that successfully. The gospels, Acts, and remaining epistles are monuments of this conciliatory tendency, which finally resulted in the Catholic church. Baur's chief works are Paulus (2nd ed. 1866) and Kirchengeschichte der 3 ersten Jahrhunderte (1853). His pupils, especially Zeller, Schwegler, and Köstlin, in their journal, the Theologische Jahrbücher, made many learned and ingenious con ributions in support of their master's position, introducing, however, important modifications in various directions. The appearance of this school called forth opposition both from those who refused to question the teaching of tradition, and those who, while prepared to grant the rights of criticism, were com-pelled to protest against an ar-bitrary and reckless application of its methods. As representative of the former may be taken J. P. Lange in his Apostolisches Zeitalter (1850 4), and J. H. A. Ebrard in his Wissenschaftliche Kritik d. Evangelischen Geschichte (2nd ed. 1850). The other standpoint is seen in the introductions of H. A. W. Meyer to the various parts of his Kritisch-Exegetischer Kommentar, and in the Einleitung of F. Bleek. These works, however, as dealing only with separate difficulties, had nothing of the epoch-making significance which belonged to A. Ritschl's Entstehung d. altkatholischen Kirche, in the second edition of which (1857) the author, a former disciple of Baur, convincingly showed that the Tübingen school had misappre-hended the essential factors in

early Christian history.
Although Baur's fundamental positions have been abandoned, his freedom from tradition and his far-reaching critical methods survive in such works as H. J. Holtzmann's Historisch-Kritische Einleitung in d. Neue Testament (3rd ed. 1892), a masterly production, and most exhaustive in the account which it takes of all that has been done in this department. The Einleitung of B. Weiss (Eng. trans. of 2nd ed., 1896) occupies a much less advanced standpoint,

and is the work of a theologian distinguished for thoroughness combined with cautious judgment. Still more conservative is the *Einleitung* of T. Zahn (1897-99), a book of prodigious learning, presenting the strongest case that could be presented by a modern scholar for traditional views of the New Testament writings. Mention must also be made of the admirable handbook of Jülicher (Einleitung in d. N.T., 2nd ed. 1894), who may perhaps be described as standing midway between Holtzmann and Weiss. Dr. Dods's Introd. to the N.T. (Theological Educator Series) is a very convenient manual on a

swaller and more popular scale.

Newton. (1.) City, Middlesex
co., Massachusetts, U.S.A., adjoins Boston, of which it is a
suburb. It manufactures machinery, silk, worsted, and rubber products. Pop. (1900) 33,587. (2.) City, Kansas, U.S.A., co. seat of Harvey co., 114 m. s.w. of Topeka. Pop. (1900) 6,208.

Newton, Alfred (1829), English ornithologist, born at Geneva; received (1854) from Magdalen College, Cambridge, a travelling fellowship, which enabled him to pursue investigations into the bird life of Iceland, N. America, and other regions. It was owing to his report on this subject that the British Association took steps (1868) to procure legislation for the protection of birds. Among his works are The Zoology of Ancient Europe (1862), The Birds of Greenland (1875), A Dictionary of Birds (1893-6), and Ootheca Wolleyana (1864-1905).

Newton, SIR CHARLES THOMAS (1816-94), English archæologist, discovered in 1856 the site and remains of the mausoleum at Halicarnassus, and also made important discoveries at Cnidus and Branchidæ. From 1861 to 1885 he was keeper of Greek and Roman antiquities at the British Museum. He held the Yates chair of classical archæology at University College, London (1880-88), and was largely responsible for the foundation of the Society for the Promotion of Hellenic Studies, the British School at Athens, and the Egypt Explora-tion Fund. Among his publica-tions are History of Discoverics at Hilic trnassus, Cnidus, and Branchidæ (1862-3), Travels and Discoveries in the Levant (1865), and Essays on Art and Archeeology (1880).

Newton, SIR ISAAC (1642-1727), English natural philosopher, was born at Woolsthorpe, Lincoln-shire. In 1665-7 he invented the binomial theorem, the method of tangents, and the fluxional cal-culus (direct and inverse). The story seems to be authentic that the fall of an apple in the garden at Woolsthorpe late in 1665 started the train of thought which led him to the discovery of universal gravitation. He certainly then deduced the rule of inverse squares from Kepler's third law, and attempted to verify it by the observed motion of the moon. It was not, however, until 1685, when Picard's improved value for the terrestrial radius was at his disposal, and he had overcome the difficulty of calculating the attraction of a sphere upon an adjacent particle, that he ascertained the agreement to be exact. The great work embodying his conclusions was published in July 1687, with the title Philosophia Naturalis Principia Mathematica. The first book expounded generally the dynamical results of the law. The second treated of motion in a resisting medium, hydrostatics, hydrody-



Sir Isaac Newton. (Photo by Walker & Cockerell, from the painting in the National Portrait Gallery.)

namics, and the theory of the tides. Finally, Book III. showed the working of the attractive principle in the solar system, and demonstrated the subjection to it of comets. Newton's optical researches began in 1666, when he resolved white light into its constituent colours. Two years constituent colours. Two years later he constructed the first reflecting telescope, and in papers communicated to the Royal Society in 1672 and 1675 described his prismatic experiments and the phenomena of thin plates. (See Newton's Rings.) His results were collected in a volume on Optics (1704), in which the emission theory of light was advocated. Newton succeeded Barrow as Lucasian professor of mathematics at Cambridge in 1669. He represented the university in the convention of 1689; but though again elected to Parliament in the Whig interest in

1701, he was rejected at the polls in 1705. He became in 1696 warden, and in 1699 master, of the Mint; was knighted by Queen Anne in 1705; and acted as president of the Royal Society from 1703 until his death. The first account of his new calculus was in the form of two letters drawn up for Wallis in 1692, and he corresponded with Leibniz on the subject in 1693. The contraction of the subject in 1693. troversy regarding their respective claims to priority dragged on for a score of years from 1705. The facts elicited left no room for doubt of Newton's originality. His disputes with Flamsteed were no less wearisome and unwelcome. He was engaged in 1694 5 on the laborious task of perfecting his lunar theory, for which purpose Flamsteed's observations were indispensable. They were communicated partially and reluctantly, and the annoyances involved caused Newton to abandon his pursuit of the moon's inequalities. This contest embittered seven years of his life. He died at Kensington, and was buried in Westminster Abbey. A bibliography of works by and relating to Newton was published by G. J. Gray in 1888. See *Lives* by Sir David Brewster (ed. 1893)

and A. de Morgan (1885). Newton, JOHN (1725-1807), English divine and hymn-writer, was born in London. After being a sailor, a slave-trader, and a tide surveyor at Liverpool (1755-60), he became in 1764 curate of Olney, Bucks. It was here that he formed that close friendship with the poet Cowper which resulted in their joint production of the Olney Hymns (1779). The stern Calvinism of Newton did much to deepen the melancholy from which Cowper suffered. He also published Remarkable and Interesting Particulars in the Life of the Rev. John Newton (1764). See Memoirs by Cecil, prefixed to Newton's Collected Works (1808), and by Bickersteth (1843).

Newton, JOHN (1823-95), American engineer and soldier, born at Norfolk, Virginia. He was present at many of the battles of the civil war, and led a division at Fredericksburg, Salem, and Gettysburg (1863), as well as durthe campaign in Georgia
4). He subsequently did (1864).much to develop the utility of New York and other harbours (1866-85). He served as com-missioner of public works for New York (1887-8).

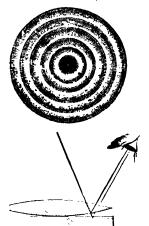
Newton - Abbot, tn., Devon-shire, England, 16 m. s.s.w. of Exeter. St. Augustine's convent is a handsome modern building. There are railway (G.W.R.) work-shops. Pop. (1901) 12,518. Newton-in-Makerfield, ur-

ban dist. (comprising the town-

ships of Newton-le-Willows and Earlestown), Lancashire, England, 15 m. w. of Manchester. Industries include printing and stationery works, paper mills, glass works, and locomotive and engineering works, and there are collieries. The Liverpool Corporation has here a reformatory school, with market garden and farm. Pop. (1901) 16,699.

Newton's Rings, a phenom-

Newton's Rings, a phenomenon due to the interference of light, described by Sir Isaac Newton in 1675. When two glass surfaces—one plane, the other slightly convex—are pressed together, a series of tinted fringes are seen to surround concentrically the point of contact. If the illumination be with ordinary white light, they are seven in number, the inner edges being coloured blue or violet, the outer



Newton's Rings, and Diagram showing the path of the ray of light producing the red ring.

reddish. They are caused by the different lengths of the paths traversed by the beams separately reflected from the curved and flat surfaces, but reaching the eye simultaneously. When they arrive in opposite phases of vibration, there is destruction; when in similar phases, there is reinforcement of light: and these effects are produced at different distances from the centre for the different colours. The interval between the glasses, in fact, varies as the square of the central distance; and it is the width of the interval which determines whether waves of a given length shall neutralize each other or conspire. The measurement of the rings thus gives the wavelengths of prismatic light; and Newton virtually obtained this result, though he interpreted it in terms of the emission theory.

Transmitted light also gives rise to coloured rings. They are of a complementary character to those due to reflection, the central spot being white instead of black.

Newton-Stewart, mrkt. tn. and police bur., Wigtownshire, Scotland, 50 m. by rail w.s.w. of Dumfries; has manufactures of agricultural implements and tweeds. Pop. (1991) 2,204.

Newtown. (1.) Town, Montgomeryshire, Wales, on Severn, 13 m. s.s.w. of Welshpool; is the centre of flannel manufacture. Robert Owen, the founder of English socialism, was a native (1771). Pop. (1901) 6,500. (2.) Suburban munic., Sydney, New South Wales, Australia. Pop. (1901) 22,623.

Newtownards, tn., Co. Down, Ireland, 9½ m. E. of Belfast, near head of Strangford Lough. Muslin, damask, and hosiery are manufactured, linen embroidery and flax-spinning are carried on, and there are nurseries. Pop. (1901) 9,110.

New Trial. See TRIAL.

New UIm, city, Minnesota, U.S.A., co. seat of Brown co., on Minnesota R., 76 m. s.w. of Minneapolis; is the centre of a rich agricultural and stock-raising district, and carries on considerable trade; has grain elevators, flour mills, breweries, machine shops, and pipe-organ manufactories. In 1862 it was the scene of a massacre by Indians. Pop. (1900) 5 403 largely Germans.

(1900) 5,403, largely Germans.

New Westminster, tn., former cap. of British Columbia, Canada, near mouth of Fraser R., here about a mile wide, and containing several inhabited islands. It is 75 m. N.E. of Victoria, is in the midst of the gold region, and has an export trade in lumber canned salmon, and fish oil; also anthracite and bituminous coal. Pop. (1901) 6,499.

New Whatcom, city, Washington, U.S.A., co. seat of Whatcom co., on Puget Sound, 80 m. N. of Seattle. Pop. (1900) 6,834.

New-Year's Day. As far back as 3000 B.C. the New-Year festival, called Zakmuk, was celebrated by the ancient Babylonians, being specially associated with the sun-god Marduk or Bel-Merodach. It was believed that Marduk himself sat in council with his lesser gods within a chamber of his great temple at Babylon, and that then and thore they predestined the events of the coming year, with special reference to the fate of the king's life. The Zakmuk rejoicings lasted for cleven or twelve days, during the early part of the month of Nisan (latter March). Dr. J. G. Frazer shows how the Jewish Purim feast, the Grock festival of Cronus, the Roman Saturnalia, and the mod-

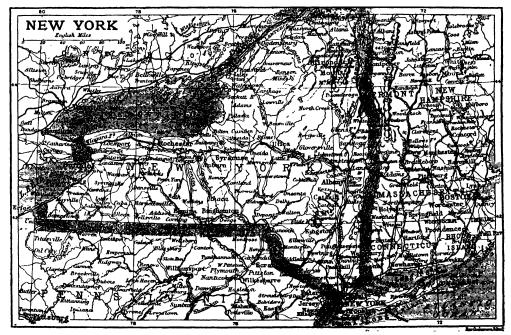
ern carnival all have affinity with this Babylonian celebration. But the beginning of the year did not synchronize in each case. Whereas the vernal equinox marked the Babylonian Now Year, the year of the Romans ended at the winter solstice. But in either case the root idea appears to have been the revival of the sun's strength; and the solar worship of Babylon is paralleled by that of the sungod Mithra in Rome, where the special day of celebration (25th December) was known as the Dies natalis Solis invicti. The survivals in modern Europe of the ancient New Year rites and customs are too numerous to le detailed. But the giving of presents, known in ancient Rome as strenæ, and in modern France as étrennes, flourished at the English court until the 17th century, and still survives in Scotland and in France. Boxing Day in England and Handsel Monday in Scotland also testify to the same usage.

New York. (1.) Popularly the empire state, N.E. state of U.S.A., lies between 40° 30′ and 45° N. and 72° and 79° 45′ W., bordoring on the N. on Canada and Lake Ontario. It was one of the thirteen original states, and has an area of 47,620 sq. m. The N. part of the state is occupied to a large extent by the irregular group of the Adirondack Mts., the culminating point of which is Mt. Marcy (5,344 ft.). In the southern part of the state the Alleghany plateau extends northwards nearly to Lake Ontario, and to the Hudson R. on the E. Along the Hudson it is eroded into the Catskill Mts. (Slide Mt., 4,220 ft.). On the N. the Laurentian glacier has ploughed many long, narrow furrows into the slope of the plateau, several of which are now filled with water, forming the Finger water, forming the Finger Lakes. The principal river of the state is the Hudson, with its main branch, the Mohawk. The farming industry ranks second in importance to manufactures and commerce. The chief industries are clothing, foundry and machineshop products, printing and publishing, sugar and molasses refin-ing, malt liquors, slaughtering and meat-packing, tobacco and cigars, lumber, flour, chemicals, hosiery lumber, flour, chemicals, hosiery and knit goods, furniture, petroleum-refining, paper and wood pulp, cheese, butter, and condensed milk, boots and shocs, leather and leather goods, clectrical apparatus, silk and silk goods. The mineral products include iron ore, sult, petroleum, and natural gas. There are mineral springs at Saratoga, Richfield, and Sharon Springs. Richfield, and Sharon Springs. New York is the most populous state in the union, having in 1900 a population of 7,268,894. The

increase in the preceding ten years was 1,265,720, or at the rate of 21 per cent. The proportion of urban population was 68 per cent. Albany is the capital. (2.) Principal city in state of same name, and chief city in United States. In population it is the second city in the world. It is composed of five boroughs, on New York Bay, and on Hudson and East rivers. Manhattan borough occupies the long and narrow Manhattan 1., Bronx is on the mainland to the N., Richmond occupies Staten I. on the w. side, Brooklyn is on the w. end of Long I., fronting the harbour and East R., and Queens is on Long I., E. of Brooklyn. The

is in the north, and the business portion is that part fronting on East R. and the upper harbour. The southern part is largely marshland. At the south-western extremity of Long I., in this borough, stretches a sandbar, known as Coney I., on which are summer resorts. Queensborough has several large population centres, among them Long Island City and Flushing. Richmond borough (Staten I.) contains numerous villages. The harbour is protected by fortifications at Sandy Hook, the Narrows, and at the upper entrance to East R., or Long Island Sound. In the borough of Brooklyn is a United States navy yard. Manhattan is

acres; another is Brooklyn Forest Park. In Manhattan are Columbia University (1764), New York University, the College of the City of New York, Manhattan College, St. John's College, and the College of St. Francis Xavier. In Brooklyn are the l'olytechnic Institute, Adelphi, St. Francis, and St. John's colleges. Among the notable structures the tallest is the Park Row building, containing 32 stories, and the Ivine Syndicate building (382 ft. in height), of 29 stories; but there are scores which exceed 300 ft. Among the 550 churches of the city are Old Trinity, far down town, opposite the head of Wall Street, Grace Church, Madison



area of the city is 327 sq. m. The harbour, at the mouth of the Hudson, is divided into two parts by the Narrows. The upper harbour connects with Long Island Sound by East R., which is connected with the Hudson by Harlem R., separating the upper end of Mauhattan I. from the mainland. Opposite Manhattan borough, on the w. side of the Hudson, is Jersey City. Manhattan borough is closely built. The lower half is devoted to business, and the business area is constantly moving northward and encroaching on the residential portion. Bronx borough is mainly a residential are grouped in villages. The mos. thickly settled part of Brooklyn borough

connected with Brooklyn by two suspension bridges (1883 and 1904). Water is obtained from lakes north of the city for the boroughs of Manhattan and Bronx, and for Brooklyn from wells east of the borough. The first portion of the New York rapid transit underground railway was opened in October 1904. This subway is to extend from one end of Manhattan to the other, with various branches. The total area of public parks is 6,730 acres. The best known is Central Park, in Manhattan (840 acres). To the north of it are Morningside and Riverdale parks, the latter running down to the Hudson. The best known in Brooklyn borough is Proepect Park, of 520

Square Presbyterian Church. Episcopal Church of the Ascension, First Presbyterian Church, Church of the Transfiguration, St. Patrick's Cathedral, and two fine Jewish synagogues. The National Academy of Design is one of the principal art centres of the United States. The Metropolitan Museum of Art, adjoining Central Park, contains a large collection of ancient and modern works. The American Museum of Natural History is in Manhattan Square. The principal street of Manhattan is Broadway, running the entire length of the island. Eastward from Broadway, in the southern part of the island, is Wall Street, the financial centre of the city. Here also are the custom-house.

the United States Sub-Treasury, the stock exchange, and many banks. The city hall and courthouse, both built of white marble, are a few blocks farther up town. New York is not only the most important scaport of the country, but it is also by far the greatest manufacturing city. The leading products are, in the order of their importance, men's and women's clothing, refining of sugar and molasses, printing and publishing, foundry and machine-shop

Settlement was commenced here by the Dutch W. India Company in 1624, and in 1650 the town known as New Amsterdam contained about a thousand in-habitants. In 1664 it was seized by the British, and granted by Charles II. to his brother the Duke of York, in honour of whom it received its present name. It was retaken by the Dutch in 1673, and in the year following was transferred to the British, who held it until the revolution.

Sandy NEW YORK AND ENVIRONS English Miles Highlan

products, liquors, tobacco, slaughtering and meat-packing, and petroleum-refining. Not less than 63 per cent. of the imports of the whole country comes through this port; and of the exports, 38 per cent. goes out from it. Its imports in 1905 were £153,600,000, and its exports were £125,700,000. New York is the principal western terminus of the transatlantic steamship lines, and three-fourths of the emigrants to the United States land at this port.

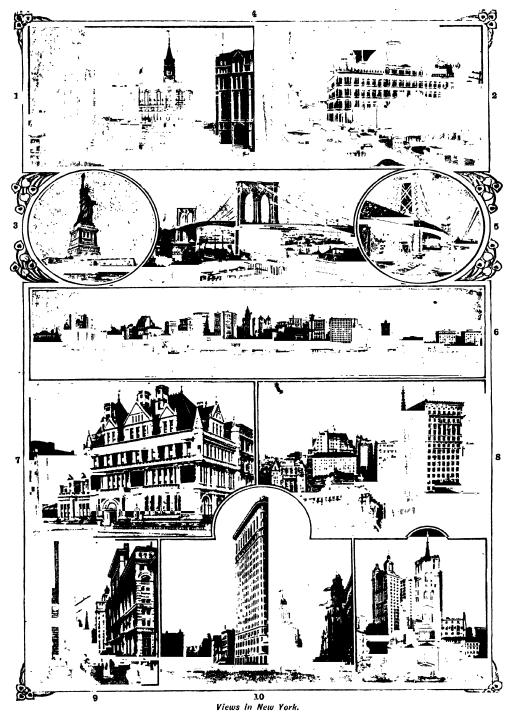
During the revolutionary war it was the scene of the battles of Long I. and Harlem Heights, in which the Americans were defeated. From 1785 to 1790 it was the seat of the Federal government. In Federal Hall, the building now used as the United States Sub-Treasury, Washington was inaugurated as president, and the meetings of the first Congress were held. The city remained the national capital for five years, and was the capital of

the state until 1797. Up to 1897 New York comprised only Manhattan I. and a tract of land north of Harlem R., nearly the same as what is now Bronx borough. In the above year all the present territory was consolidated in Greater New York. Pop. (1900) 3,437,202, of whom 49'6 per cent. were males, and 50'4 per cent. females. The number of foreignborn was 1,270,080, or 37 per cent. The population of the boroughs was : Manhattan, 1,850,093; Bronx, 200,507 ; Brooklyn, 1,166,582; Richmond, 67,021; Queens, 152,999. New York Central Railway

was organized in 1869, being an amalgamation of the New York Central Railroad (1853) and the Hudson River Railroad (established 1846), and is now one of the principal railway systems in the United States. The title is the New York Central and Hudson River Railroad, and has a total mileage of 3,514, the main track running f om New York to Buffalo and Chicago. The dividends on the share capital, which amounts to \$132,250,000, have been very large, 5 per cent, on the ordinary shares in 1900-5, and the surplus profits amounting to over one and a half million dollars per annum. The family of Vanderbilt controls the railway system.

New York Herald, the greatest of the American daily newspapers, was founded in 1835 by James Gordon Bennett, a native of Banfishire, Scotland. The enterprise with which the Herald was conducted, the enormous sums spent, and the ingenious devices resorted to for securing early and exclusive news, created quite a new departure in journalism. One of the special features of the Herald has always been its money articles, which were originally written by Bennett himself. In 1866 James Gordon Bennett, the first, retired in favour of his son, the present editor and proprietor. In 1870 the *Herald* equipped and sent out Sir Henry Stanley's expedition to Africa in search of Livingstone. In 1878 Stanley was again dispatched to Africa on a journey of exploration by the Herald in conjunction with the

New York Sun, one of the oldest daily papers in the United States, having been founded in 1833. It first became a power under the editorship of Charles A. Dana, who took over the direction in 1868. The Sun acquired great notoriety for the sensational character of its news and the personal flavour of its comments. The present editor is Mr. Paul Dana, the son of Charles A. Dana.



1. World, Times, and Tribune buildings. 2. Post Office. 3. Statue of Liberty, New York harbour. 4. Brooklyn Bridge. 5. Brooklyn Bridge. (Photo by Underwood.) 6. Lower New York. 7. A New York mansion: Mr. Vanderbilt's house. 8. Trinity Church spire, and *sky-scrapers' on Broadway. 9. Wall Street and Trinity Church. (Photo by Underwood.) 10. The 'flat-iron' building, and Fifth Avenue. 11. Park Row building (32 stories) and St. Paul's Church. (Photo by Underwood.)

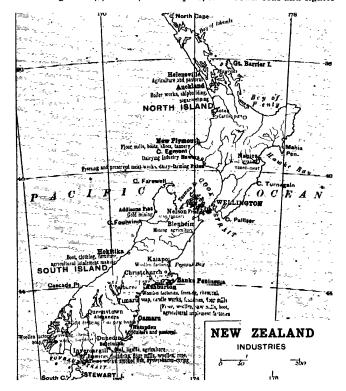
New York Tribune was founded as a halfpenny paper in 1841 by Horace Greeley, whose unique personality was the life of the paper. It was at first a Whig journal, devoted to the fortunes of Henry Clay, and sub-sequently the leading Republican journal of the United States, strongly abolitionist in the antislavery movement, persistent in advocating the policy of protection, and most strenuous in its support of Abraham Lincoln for the presidency, and in its leadership of the union cause during the civil war. The *Tribune* was identified with the Republican party from its foundation in 1854. It was also a literary journal of great power, Margaret Fuller, Richard Hildreth, Bayard Taylor, George Ripley, and Charles A. Dana writing for it; and its weekly issue had an enormous circulation among farmers. Mr. Whitelaw Reid, now American ambassador in London, succeeded Horace Greeley when the paper's fortunes were at a low ebb, in consequence of its campaign against the regular Republican candidate for the presidency. Under Mr. Reid it again became the champion of the Republican party.
New Zealand, first-class battle-

New Zealand, first-class battleship of the British navy, one of the King Edward VII. class, launched at Portsmouth (1904). See King Edward VII.

New Zealand, British colony in S. Pacific, 1,200 m. E.S.E. of Australia. Total area, 104,751 sq. m.; length, 1,100 m.; average breadth, 120 m. It consists of two long narrow main islands, North I, and South I, separated by Cook Strait, and a much smaller island, Stewart, separated from South Island by Foveaux Strait. The area of North Island is 44,468 sq. m.; of South Island, 58,525 sq. m.; of Stewart Island, 665 sq. m. Included in the colony are several outlying islands-Antipodes, Auckland, Bounty, Campbell, Chatham, Cook, Kermadec, Ma-nahiki, Palmerston, Penrhyn, Pukapuka, Rakaanga, Savage, and Suwarrow, and also, since 1901, the Cook Is. The coast is high, rugged, and in parts indented with good harbours and inlets. On the E. coast are situated nearly all the fertile plains, most of the population, and the principal towns and har-bours. In the peninsula N. of Auckland are several harbours, the finest being the Bay of Is-lands and Waitemata, on which Auckland lies. South of the Bay of Plenty there is no good natural harbour until Port Nicholson (Wellington) is reached, on Cook Strait. The chief harbours on the E. coast of South Island are Port Lyttelton and Akaroa on the volcanic Banks Peninsula, Otago harbour, and the Bluff. A chain of mountains, broken by Cook Strait, traverses North and South Islands, running parallel with the coast, and branching off into side ranges. In South Island the lofty, snow-clad Southern Alps form the boundary between the E. and W. coasts, culminating in Mt. Cook and the grand peaks surrounding the Tasman glacier. New Zealand is the scene of considerable volcanic activity, the chief line of which extends from White I. in the Bay of Plenty to Mts. Tongariro (7,515 ft.) and

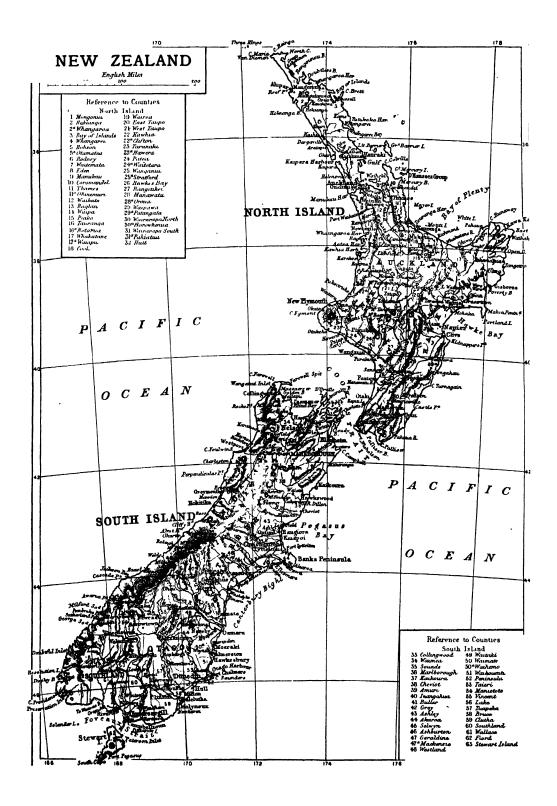
flowing northwards from Lake Taupo, is navigable for a great part of its course. The Clutha, in Otago, is the largest stream in the colony.

New Zealand contains ...bundant mineral wealth. Quartz gold-mining is carried on in both North Island and South Island; alluvial-mining in South Island. Copper has been worked at the Great Barrier and Kawau Is., and in Nelson district. Coal seams are worked at Whangarei and Waikato, bituminous steam coals at Greymouth and Westport, and brown coal and lignite



Ruapehu (9,195 ft.). The line passes through the hot lake district, with its geysers, thermal springs, and boiling lakes, and through Mt. Tarawera, which was in eruption in 1886. Mt. Egmont (8,300 ft.), a perfect volcanic cone, rises in solitary grandeur on the W. shore. Besides the Rotorua district, there are thermal springs and sanatoria at Te Aroha on the Thames, and at the Hanner Plains in the Nelson district (South Island). Earthquakes are not infrequent. The rivers are mostly mountain torrents, useless for navigation; but the longest, the Waikato,

exist at Otago and Canterbury. There are numerous building stones—e.g. Oamaru limestone. The climate, though varied, is salubrious and bracing, considerably warmer and more equable than that of Great Britain, although the weather changes suddenly. The average temperature of South Island is 4°, that of North Island 7°, higher than that of London. The mean annual temperature is 54.5°. Frost and snow are rare in North Island; in South Island frost is often seen, and snow falls occasionally. The rainfall is heavy, particularly on the w. coast. New Zealand is



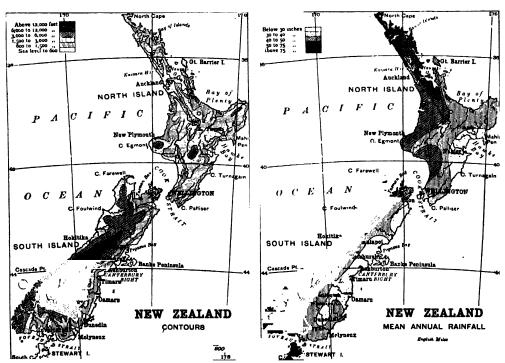


a splendid country for pastoral pursuits and agriculture. The E. coast of Auckland province is the maize district; the chief wheat and barley district is the Canterbury plains; that for oats and rye O'ago. Potatoes are largely grown throughout the colony. Dense, evergreen forest, chiefly pines and beeches, with a wealth of forns, once covered half the colony, but is rapidly being felled. The kauri pine, confined to the N., yields timber and kauri gum, and the New Zealand flax (Phormium tenax) produces fibre. The W. coast is thickly wooded; the E. is covered with

April 1907. The general government is parliamentary, with two chambers and a responsible ministry; the governor is appointed by the crown. Members of the Legislative Council (forty-six in 1901) are nominated for seven years, and paid £200 a year each; those of the House of Representatives (seventy Europeans and four Maoris in 1901) are elected for three years on a universal adult suffrage, and paid £300 a year each. The chief religions are the Church of England, Presbyterians, Roman Catholics, and Wesleyan Methodists. Primary education is free, secular, and compulsory. Univer-

Island. In 1882 the frozen-meat industry began. From 1890 has been a period of experimental socialistic legislation and of prosperity. The white population, an almost purely British race (1901), was 772,719; Maoris,43,101, of whom 40,665 were in North Island; and some 5,000 Chinese and others. Wellington is the capital. In 1906 the total population, exclusive of Maoris, was 883,437. See W. P. Reeves's The Long White Cloud (1899), F. von Hochstetter's New Zealand (1867), and Henry D. Lloyd's Newest England (1900).

New Zealand Flax. See FLAX.



indigenous grasses, on which sheep thrive. North of Auckland oranges and lemons are cultivated. The only indigenous mammals are two species of bat, the native dog, and a rat. There are no snakes. The seas abound with edible fish. The rivers teem with fine trout, and red and fallow deer are plentiful in the mountains. For 1904 the value of exports was £14,748,348; of imports, £13,291,694. The chief exports are wool, frozen meat, gold, wheat and oats, butter and cheese, kauri gum, flax, and timber. An international exhibition is to be held at Christchurch, New Zealand, between November 1906 and

sity education is given at Auckland, Wellington, Christchurch (with school of engineering and technical science), and Dunedin (with schools of mines and medicine). New Zealand has about 20,000 volunteers, a small force of permanent militia artillery and engineers, and a torpedo fieet.

Tasman discovered New Zealand in 1642. In 1840 Captain Hobson made a treaty with the Maoris (whereby they ceded sovereignty to Queen Victoria, and had their lands guaranteed them), and formally annexed both islands. In 1852 responsible government was granted. From 1860 to 1870 Maori wars raged in North

New Zealand Railways. These are almost entirely owned by the government, the total mileage being (1905) 2,374. The principal lines are the Hurunui-Bluff section (1,198 m.) and the Wellington-Napier-New Plymouth (451 m.). The capital cost has been £21,701,572. The revenue for the year ending March 31, 1905, was £2,209,231, and the expenditure, £1,492,900. Revenue (1904), £122,183; expenditure, £63,682. New Zealand Spinach, a nearly hardy annual plant (Tetra-

New Zealand Spinach, a nearly hardy annual plant (Tetragonia expansa), sometimes cultivated in Britain, its young leaves heing occasionally eaten as an indifferent substitute for spinach.

Next Friend. An infant or a lunatic not so found by inquisition can only sue by his next friend, who, provided he has no interest in the matter in dispute, is generally the infant's or lunatic's nearest relative. A next friend is answerable for costs; but if his action is proper, he can recover them from the infant or lunatic.

See KIN, and Next-of-kin. DISTRIBUTION, STATUTES OF. Ney, MICHEL (1769-1815), French marshal, was born at Saarlouis. He served under Hoche and Jourdain; but it was under Napoleon that he 'sabred his way' to the front rank. He con-

government of Louis XVIII. Upon the return of Napoleon, he was induced by his soldiers to join his old chief. He was beaten by the English and their allies at Quatre Bras, but joined Napoleon at Waterloo (1815). After the flight of Napoleon he declared once more for the Bourbon monarchy; but he was sent up for trial, and on Dec. 7, 1815, was shot in Paris. See Lives, in French by Verronais (1853), Welschinger (1893), and Le Bédoyère (1902), and in German by Niessen (1902).

Nez Percés, N. American Indians, so called by the Franco-Canadian fur-traders from their habit of piercing the nose for the

opened to foreign trade in 1897.

Estimated pop. 40,000.

Ngan-hui, AN-HUI, or NGAN-HWEI, inland prov., China. Area, 54,800 sq. m.; averages about 250 m. from N. to s. and 150 m. from E. to W.; is traversed from S.W. to N.E. by the Yang-tse-kiang. The northern section is drained by the Huai R., and its features have been much changed by frequent floods. The Yang-tse-kiang basin is separated from the Huai by mountains rising (in the w.) to 7,000 ft., and from the Kiang-si and Che-kiang provinces by other mountains of equal height. The alluvial lands are (except in E. An-hui) fertile and thickly popu-





tributed greatly to the victories of Ulm, Eylau, and Friedland. From 1808 to 1811 he served in the Peninsular war, and proved himself the most capable of the officers opposed to Wellington; but he showed himself almost insubordinate when placed under the command of Masséna, and was in consequence sent into France, and subsequently took a prominent part in Napoleon's disastrous Russian campaign. He was created Baron of Moscow for his conduct at the battle of Borodino (Sep. 7, 1812). During the campaigns of 1813 and 1814 he again fought for Napoleon, but on his abdication joined the

insertion of an ornamental plug. Formerly they occupied a wide domain in the Columbia River basin. They are now generally known as Sahaptins or Shahaptins, and live in Idaho and Washington in reservations, where they

numbered about 1,800 in 1900.

Ngami Lake, 40 m. by 10 m.,
W. Rhodesia, British S. Africa,
at N. end of Kalahari Desert; is
dry in the dry season. When
discovered by Livingstone in 1849 it was part of a great water-filled depression.

Ngan-ching, or Ngan-king, cap. of prov. Ngan-hui, China, on l. bk. of the Yang-tse-kiang, about 175 m, E, of Hankow, It was

lated. Exports tea, wheat, rice, cotton, and indigo. Coal mines exist. Pop. (1902) 23,672,300.

Ngornu, tn., Bornu, Central Africa, s.w. of Lake Chad, 15 m. s.e. of Kuka; trades in cotton, amber, and metals. Estimated

population, 20,000 to 50,000.

Niagara, formerly Newark, a summer resort and the oldest town in Ontario, and first capital of Upper Canada, at mouth of

Niagara R., 15 m. below the falls. Pop. (1901) 1,258. Niagara Falls. (1.) Or CLIF-TON, tn., Canada, Ontario, at end of suspension bridge (840 ft. long and 230 ft. above water). above the falls, 40 m. s.s.E. of



The Consider or Horse-shop Fell on the right forms a majortic inward entre of \$010 ft. with a haidst of 178 ft Falls of Niagara.

Toronto. The Wesley Park and the Queen Victoria Niagara Falls Park extend 21 m. along the river. (2.) City, Niagara co., New York, U.S.A., 19 m. N.N.W.

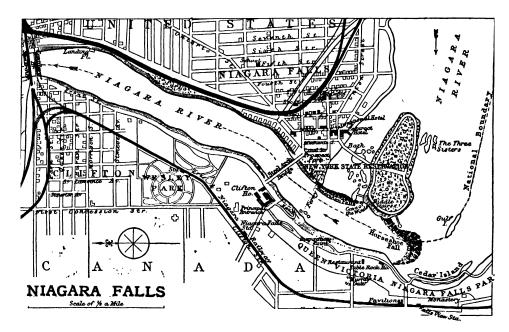
New York, U.S.A., 19 m. N.N.W. of Buffalo, on falls of Niagara R. Pop. (1949) 19,457.

Niagara Falls, on lower Niagara R., which connects Lakes Eric and Ontario, 19 m. N.W. of Buffalo, U.S.A. Below Grand Island the river descends over 50 ft of the of the publications and the state of the st 50 ft. of tumultuous rapids. At Goat Island it divides into two parts. The American Fall is 1,060 ft. wide, and the comparatively shallow water has a fall of some 167 ft.; the Canadian Fall (the Horse-shoe Fall) forms a majestic inward curve of 3,010

There are reservations on both sides of the falls, the New York state reservation occupying an area of 107 ac. on the American side, the Queen Victoria Niagara Falls Park occupying 154 ac. on the Canadian side. The falls the Canadian side. The falls were discovered in 1678. Part of the water power has since 1890 been utilized industrially on both sides of the river. The capacity of the existing power plants and those under construction amounts to about 1,000,000 h.p., and the great diversion of water is perceptibly affecting the falls.

Niam-Niam, properly A-ZAN-DEH, a negro people whose original domain comprised a great part of the Welle R. basin, and Nias, Dutch island in Indian Ocean, 65 m. w. of Sumatra; area, 2,100 sq. m. Produces pepper, rice, tobacco, and sugar. Pop. 170,000.

Nibelungenlied, or NIBELUNGE Nôr, the greatest poem in Middle High German. It is the historic product of a succession of ages, attaining its extant structure in the latter half of the 12th century. The thread of the Swabian lay is this:—Siegfried, son of the king of the Netherlands, sets out for Worms, induced to the adventure by the beauty of Kriemhild, sister of Gunther, king of Bur-gundy. He next sails for Iceland with Gunther, who has set his heart on marrying its Queen



ft., and a sheet of water, 20 ft. in thickness, takes a plunge of 158 ft. After that the river rushes through a narrow gorge, taking a sharp turn to the left and forming the whirlpool, and finally enters Lake Ontario be-yond Lewiston, after a run of 7 m. and a fall of 104 ft. The total descent from Lake Eric to Lake Ontario is 326 ft. It is asserted that the original falls were at Lewiston, and that in process of time the cliff edge has receded to its present position. The edge is still receding, the Canadian side showing a backward movement of four or five feet per annum, the American side half a foot. Three bridges span the river below the falls.

stretched across the Nile-Congo divide nearly to the left bank of the White Nile above Lado, with a population (1903) of not less than 2,000,000. They are pronounced cannibals; yet they stand intellectually, and even morally, far above the ordinary full-blood negro. They are distinguished by their broad, round features, oblique eyes set far apart, long ringlety rather than woolly hair, and dark reddish complexion. The Zandeh empire, a hereditary monarchy, founded some two hundred years ago, was broken by the Arabo-Nubian slave-raiders. See G. Schweinfurth's Heart of Africa (1873), and W. Junker's Travels in Africa (Eng. ed. 1890-2).

Brunhild, though the condition is to overcome her in three trials of strength, or lose his head. With his Tarnkappe ('cloak of darkness') Siegfried contrives to take Gunther's place, and wins the wager for the king. Sieg-fried's reward is the hand of Kriemhild. Jealousy, however, breaks out between the two queens, and, at Brunhild's instigation, Siegfried is treacherously slain. The widowed Kriem-hild, having married Attila, in-vites Gunther and his court to wites Gunther and his court to the land of the Huns, where they are all massacred. Die Klage, or 'the Lament of the Survivors.' is a continuation of the Nibelungenlied, also in \$12.41. Mich. (Journal and of Middle High German and of

Managua is the

capital. See Niederlein's The State of Nicaragua (1898), and

the 12th century. This poem is based, not on the extant version of the Nibelungenlied, but on an older Latin work composed by Conrad at the request of Bishop Pilgrim of Passau. Of far inferior merit, technical and imaginative, to the Nibelungenlied, the Klage is characterized by simplicity and sincerity. The most notable editions of the text of the Nibelungenlied are those of Lachmann (1826; 12th ed. 1902), Zarncke (6th ed. 1887), and Bartsch (6th ed. 1886); in modern German those of Von der Hagen (1852), Simrock (58th ed. 1906), Bartsch (1880), Hahn (1884), Engelmann (1889), and Schröter (ed. 1902); among English translations those of Foster-Barham (1887), Armour (1897), and Horton and Bell (1898). The

by a prize poem, Tasso's Död (1826), Konung Enzio (1828), and Lejonet i Öknen (1838), in praise of Napoleon. His work exhibits in a high degree both tenderness of feeling and grace of form.

Nicaragua. (1.) Central American republic, stretches from the Caribbean Sea to the Pacific. Area, about 49,000 sq. m. A line of volcanoes between the Pacific and the lakes Managua and Nicaragua forms the watershed. In the N. ridges reach from 4,000 to 6,000 ft. These sink down to the lakes and the valley of the San Juan. The Atlantic coast is low and swampy. It has been suggested that the name America is derived from the short Sierra de Amerrique, and not from Amerigo Vospucci. The

m., it has an area of 2,975 sq. m. It is less than 50 ft. deep over the greater part of its area. Its level is subject to great variations. The lake is drained by the San Juan into the Caribbean Sea.

Nicaragua Canal, a shipcanal projected to connect the Atlantic and Pacific coasts in Central America. The work was commenced in 1893. The canal, it was estimated, would be 170 m. in length, of which only 28 m. would require excavation, after utilizing Lake Nicaragua and the San Juan River. The elevation of the highest part would be 110 ft. above s:a-level, surmounted by eight locks, with an average depth of 30 ft. and a minimum width of 100 ft. In 1901 a treaty was signed between Great Britain and the United States, modifying the Clayton-Bulwer treaty of

and the imports £492,184. Pop.

Walker's Ocean to Ocean, an Ac-

valker's occan to occan, an Account of Nicaragua and its People (1902). (2.) Lake in republic of Nicaragua, Central America. With a length of 100

m. and a maximum breadth of 45

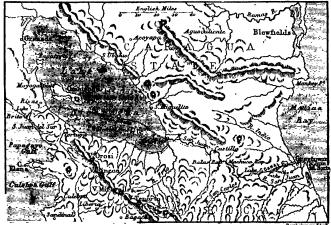
(1900) 500,000.

ragua scheme in abeyance.

Niccolini, Giambattista
(1781-1861), Italian dramatist,
was born at S. Giuliano, near
Pisa, and came to be professor
of history and mythology and
secretary at the Florentine Academy of Fine Arts. His dramas
are almost all political and patriotic. The first series deals with
Greek themes (written 1810-14),
the second with more modern
times (written 1815-58). The most
effective on the stage is Antonio
Foscarini; but the finest and
most famous is Arnoldo da Brescia (Eng. trans. by Garrow, 1846),
which is full of beautiful and impassioned verse. The best edition
of the Opere is that of Gargiolli
(1900), 1875-84). See monographs
by Barelli (1888), Ostermann
(1900), and Leoni (1901).

1850, and neutralizing the proposed canal. In 1903 the United States finally decided that the canal at Panama should be proceeded with, leaving the Nica-

Nice (Ital. Nizza), tn. and cap. of dep. Alpes-Maritimes, France, 110 in. s.w. of Genoa. The mountains on the north shelter it from cold winds; and though the N.w. mistral in early spring whirls up clouds of dust, and the sirocco from the S.E. produces languor, the climate of Nice has been celebrated for ages. The chief residential quarter of the foreign visitors (varying annually from 15,000 to 30,000) is on the w., and on the E. is the Old Town. Many villas nestle on



Nicaragua Canal.

text of the Klage is edited by Edzardi (1875), and done into modern German by Ostfeller (1854). See R. C. Boer's Untersuchungen über den Ursprung und die Entwicklung der Nibelungensage (vol. i., 1906).

Nicæa, anc. city, Asia Minor, in Bithynia, founded by Antigonus about 300 B.O. The kings of Bithynia frequently made it their residence. In 325 A.D. it was the seat of a general council of the church summoned to settle the Arian controversy; hence the creed then adopted is called the Nicene Creed. The modern name of the town is Isnik.

Nicander, KARL AUGUST (1799-1839), Swedish poet, was born at Strengniës; he was sent by the Swedish Academy to Italy (1827-9), and the degree to which Italy possessed his love appears in his poom, Minnen från Södern (1831-9). His tragedy in verse, Rungsvårdet (1821), was followed

climate is hot, but not unhealthy, being mitigated by the prevailing trade winds. On the Caribbean side rain falls almost every day, causing a great luxuriance of vegetation. The population is composed chiefly of Indians, ladinos or half-breeds, negroes, and sambos, the offspring of Indians and negroes. Agriculture is the principal industry, especially the cultivation of coffee, which, with forest produce—e.g. mahogany, logwood, and fustic—is exported. Some gold mines are worked. The chief ports are Greytown on the Atlantic and Corinto on the Pacific. Nicaragua proclaimed its independence in 1821, and after forming part of the Mexican empire joined the republic of Central America until 1838, when it became a separate state. The government consists of a president, and of two chambers chosen by universal suffrage. In 1905 the exports amounted to £730,458, the green-clad slopes of the surrounding hills, and spread over the terrace of Cimiès (2 m.) To the s.E. of the Old Town lies Castle Hill (320 ft.), laid out as a public garden, and E. of that is the well-sheltered port. Nice exports wine and liqueurs, olive oil, glass and pottery, fruits, and soap, and manufactures art-pottery and olive-wood inlay work. Nice fell into Roman hands in the 2nd century B.C., and after being possessed by the Saracens (10th century), and pillaged by the Turks (1543), was finally ceded to France (1860) by Sardinia. Garibaldi was born in Nice (1807), and Massena (1758) in the vicinity, while the Rue Smollett commemorates the residence here (1763-5) of the author of Humphrey Clinker. Pop. (1901) 105,200.

Nichol, John (1833-94), British author, born at Montrose. From 1862 to 1889 he was professor of English literature at Glasgow University. In 1873 he published his strong dramatic poem Hannibul, and in 1881 The Death of Themistocles and other Poems. He also contributed Byron (1880) and Carlyle (1892) to the English Men of Letters Series, and Bacon (1888-89) to Blackwood's Philosophical Classics; wrote monographs on Burns (1882) and American Literature; and edited Sydney Dobell's Poetical Works (2 vols. 1875), and a volume of Dobell's Unpublished Papers (1876). A Memoir by Professor Knight appeared in 1895.

Nicholas, name of five popes.
Nicholas, (858 68), of Roman birth, succeeded Benedict III. He was a vigorous upholder of the power of the Holy See; and his conflicts with Photius of Constantinople, with Hinemar of Rheims, and with the Emperor Ludwig, each came to a triumphant conclusion.—Nicholas iv. (1288-92), of Italian birth, was the first Franciscan pope. He made vain efforts to rouse Europe to a crusade against the Turks.—
Nicholas v. (1447-55), of Italian birth, took an active part in the revival of learning, and was the virtual founder of the Vatican library.—An antipope, who assumed the name of Nicholas v., was set up by Ludwig of Bavaria against John xxII. in 1328, but finally submitted.

Nicholas I. (1796-1855), emperor of Russia, succeeded his father. Alexander I., in December 1825. He dealt in forcible fashion with the question of Greek independence in 1827. His armie: had already triumphed in a war with Persia in 1826, and in 1828 he began hostilities with Turkey. The success of the Russian arms resulted in the treaty of Adrianople (Sept. 14, 1829), and Moldayia and Walachia were

placed under Russian protection. In 1830 the July revolution in France stirred up the Poles; but the Russian troops suppressed the movement, and Poland was incorporated with the Russian empire. In order to restrain liberal tendencies in Europe, Nicholas joined the rulers of Austria and Prussia in 1833, as a set-off to the understanding between England and France. In July 1853 Russia entered upon war with the Porte, and a rupture with the British and French caused the Crimean war. During its progress Nicholas died.



Nicholas II., Emperor of Russia.

Nicholas II. (1868), emperor of Russia, succeeded his father, Alexander III., in 1894, and immediately after was married to Princess Alexandra Alix, daughter of Ludwig IV., Grand-Duke of Hesse, and of Princess Alice of Great Britain. In 1896 he was crowned at Moscow, and the same year visited Berlin, Balmoral, and Chalons, at the last of which reviewed 100,000 French troops. His visit to Paris accentuated the friendly agreement between France and Russia, an alliance definitely announced when President Faure visited St. Petersburg the following year. In 1899, at his initiative, the Hague Conference met, its object being the promotion of universal peace. He ruled in accordance with the traditionary absolutist policy of Russia down to the end of 1905, when the national will forced from him a constitution. A representative assembly -the Duma -was constituted, but it soon came to an open rupture with the autocratic crown party, and was dissolved. The election of a new Duma was promised in 1907. See also Russia.

Nicholas I. (1841), prince of Montenegro, succeeded his uncle

Danilo I. in 1860. Nicholas has reformed the army, the civil administration, and education. During his reign Montenegro obtained from the powers recognition of its independence in the treaty of Berlin (1878).

Nicholas, ST. See NICOLAS, Nicholas of Damascus, a Greek historian, who lived in the 1st century B.C. He was the friend of Augustus and Herod the Groat. Besides an autobiography full of anecdote, he wrote a General History, Lives of Augustus and Herod, a work on singular usages, a number of tragedies and comedies, and philosophical treatises and commentaries on the older philosophers. His works have been edited by Feder (1850) and Dindorf (1870).

Nicholas of Hereford (fl. 1390), English Lollard preacher and author, was in 1382 excommunicated with his friend Wycliffe. A journey to Rome ended in his imprisonment until 1385, when he escaped to England. Subsequent imprisonment led him to recant (c. 1391). Thenceforth he became a vigorous opponent of Lollardism, heing treasurer of Hereford (1397-1417), and ended his life as a monk.

Nicholson, EDWARD WILLIAMS BYRON (1849), British author and librarian, born at St. Helier, Jersey; was appointed in 1882 to take charge of the Bodleian Library, having been librarian at the London Institution (1873-82). Among his works are New Homeric Researches (1883), Vernacular Inscriptions of the Ancient Kingdom of Alban (1896), Golspie (1897), The Man with Two Souls, and Other Stories (1898), Language of the Continental Picts (1900), and Keltic Researches (1904). He collaborated in Sir John Stainer's works on early Bodleian music (1899 and 1902).

Nicholson, Henry Alleyne (1844-99), English biologist, was born at Penrith, Cumberland. After holding professorships at Toronto (1871-4) and Durham (1874-5), he occupied the chair of natural history at St. Andrews (1875-82) and at Aberdeen (1882-99). He wrote a Manual of the British (traptolitide (1872); Manual of Zoology (1870; 7th ed. 1887), Manual of Paleontology (3rd ed. 1889), and Introduction to the Study of Biology (1872).

Nicholson, John (1821-57), British general and administrator, born at Dublin; entered the service of the East India Company (1839); in 1842 was taken prisoner to Kabul, and was present at the battle of Ferozeshah (1845). His administrative ability and speedy punishment of the Sialkot rebels ensured the safety of the Punjab during the mutiny. When Delhi

was attacked, Nicholson led the was accepted, Nicholson led the storming party, and fell mortally wounded. Great physical strength and genial Christian character won him the affection of the Sikhs, who defied him as 'Nikkil Singh.'

Nicholson, JOSEPH SHIELD (1850), English political economist, was born at Wrawby in Lincolnshire. From 1876 to 1880 he was a private tutor at Cambridge, then professor of political economy in Edinburgh Unical economy in Edinburgh Christips, His works include Effects of Machinery on Wages (1878), The Silver Question (1886), Principles of Political Economy (1893-1901), Strikes and Social Principles of Foutical Economy (1893-1901). Strikes and Social Problems (1896), Elements of Political Economy (1903), The Tariff Question (1903), and Rates and Taxes as affecting Agriculture (1905). He has also written romances entitled Thoth (1888), A Dramme of Drams (1889), and Dreamer of Dreams (1889), and Toxar (1890).

Nicholson, WILLIAM (?1782-1849), the bard of Galloway, was born at Tannymaas, Borgue, Kirkeudbrightshire, and led the life of a peddler. His *Poems* appeared in 1814, and again in 1828. The Brownie o' Blednoch bears the stamp of genius. The Country Luss is his most elaborate effort. See his Poetical Works, with memoir by Harper (4th ed. 1897).

Nicias (c. 470 to 413 B.C.),

Athenian statesman and general, was a member of the aristocratic party, and an opponent of the war policy of Pericles. In 427 B.C. he captured Minoa, the island off Megara; in 426 he ravaged Melos; in 425 he defeated the Corinthians; and in 424 he captured Cythera. In 421 he was the chief agent in arranging the peace with Sparta. Soon afterwards he came into rivalry with Alcibiades, but eventually joined forces with him. Nicias next opposed, but was forced to lead, the great expedi-tion to Syracuse in 415 s.c. The enterprise terminated in disaster, and Nicias was put to death by the Syracusans. He did more than any one man to ruin Athens.

Nickel, Ni, 587, a metallic element resembling iron. It is chiefly extracted from a variety of iron pyrites; from garnierite, which is a silicate of nickel and magnesium; and from kupfernickel and nickel blende, which are nickel arsenide and sulphide respectively. The metal is set free by furnace methods, by the gas method, and by the wet method. The chief furnace method depends on the formation of a matte of nickel sulphide, which is refined in a Bessemer converter, roasted to oxide, and then reduced by carbon. In the gas method, or Mond process, the roasted ore is heated in water

gas to 400° c., by which the nickel is reduced to the metallic state. It is then treated in iron cylinders at a temperature of 80° c. with carbon monoxide gas, by which nickel carbonyl gas, Ni(CO)4, is produced. The nickel is set free from the latter by heating it in tubes to 180° c., and the carbon monoxide is again available. In the wet method the roasted ore is treated with hydrochloric acid, and after the pre-cipitation of iron, arsenic, and cobalt, the nickel is thrown down by lime as oxide, which is afterwards reduced by charcoal.

Nickel thus obtained is refined by remelting and adding about 0'1 per cent. of aluminium or magnesium. The metal is hard, malleable, ductile, and tenacious, of a white colour, somewhat magnetic, and tarnishes but little in the air. Its specific gravity is 8'8, it melts at about 1,480° c., and is a fair conductor of electricity. Nickel forms two classes of compounds, the corresponding oxides being NiO and Ni₂O₃. From the former of these, which is a gray solid, the ordinary nickel salts of fine green colour are derived. The oxide, Ni₂O₃, is black, loses oxygen on heating, and forms unstable salts. Nickel forms nickel carbonyl, Ni(CO)₄, with carbon monoxide. This substance is a volatile, unpleasant smelling liquid of poisonous character. It is utilized in the preparation of the metal by the Mond process described above. Nickel is used to a certain extent for the manufacture of crucibles, tongs, spoons, but is chiefly valuable in its alloys. Of these, nickel steel, containing about 3 per cent. of nickel, is of high tensile strength, whilst alloys containing more nickel have valuable magnetic properties, and scarcely expand heating. German silver, which is a brass with from 15 to 25 per cent. of nickel, is useful for spoons, and for wires for electrical resistances. Platinoid is a similar alloy, with about 2 per cent. of tungsten in addition. Nickel with 25 per cent. of copper is used for coinage, the metal being also largely employed for protecting iron and brass from tarnishing. For the latter purpose it is electro-deposited from a bath of the double sulphate of nickel and ammonium, plates of nickel being used as anodes. Nickel Carbonyl. See Nickel.

Nickel-plating. See Electro-DEPOSITION

Nickel Silver. See GERMAN

Nicobar Islands, a group in the Indian Ocean, forming, together with the Andaman Islands, a dependency of the government of India. They lie s. of the

Andamans, and about 150 m. N.W. of Sumatra. They consist of Great and Little Nicobar, and various smaller islands. Total various smaller islands. Total area, 635 sq. m. The climate is tropical. The principal productions are cocoanuts and copra. There is a good harbour at Nancowry. The inhabitants are Macoury. lays, and in 1901 numbered 6,310. They were for generations addicted to piracy, but have abandoned their former habits since the British occupied Nancowry Harbour (1872). See Kloss's In the Andamans and Nicobars (1903). Compare also Andaman Islands.

Nicol, ERSKINE (1825-1904), Scottish genre painter, especially of Irish life and character, was born at Leith. From 1845 to 1849 he lived in Dublin, but in 1862 settled in London. He was R.S.A. and A.R.A. Among his most popular works are Among the Old Masters, Both Puzzled, Paying the Rent, The Trio, and

Interviewing their Member.
Nicol, WILLIAM (1768-1851), inventor of the polarizing prism. He effected a great advance in the method of cutting sections, which materially assisted him in his investigations into the structure of fossil woods. He made for his own use lenses of precious stones, as an advance on the defective lenses in use. His papers appeared in the Edinburgh Philo-

sophical Journal. Nicolai, Christoph Friedrich (1733-1811), German littérateur and bookseller, was born at Berlin, where he spent his life chiefly, taking an energetic part in the controversies of the time. His friendship with Lessing dated from the publication in 1755 of his Briefe ueber den jetzigen Zustand der schönen Wissenschaften. From 1757-60 he conducted the periodical, Bibliothek der schönen Wissenschaften; and from 1765-91 the Allgemeine deutsche Bibliothek, in which he made himself the mouthpiece of the opposition to the leaders of the new move-ment in thought Kant, Fichte, and Goethe often showing him-self narrow and bigoted. He published Anckdoten von Friedrich II. (1788), and an Auto-biography (1806). See Göckingk's Nicolais Leben (1820).

Nicolai, Otto (1810-49), German operatic composer, was born at Königsberg. He was court operatic musical conductor at Vienna (1841-7), and at Berlin, and the founder (1842) of the Philharmonic concerts in Vienna. His operas enjoyed a large measure of favour, and he also took high position as a conductor. His most successful work is a comic opera, The Merry Wires of Windsor (1849). See Otto Nicolai, by Mendel (ed. 1866) and Schröder

(1892).

Nicolaitans, a heretical and probably Antinomian sect in the apostolic church. They are mentioned with stern disapprobation in Rev. 2:6, 15, as being hated by the church at Ephesus, but tolerated in the community at Pergamos. By some ancient writers—c.g. Irenaus and Hippolytus—they are regarded as the followers of Nicolas, the prose-lyte of Antioch, and one of the seven deacons of Acts 6; but it is more probable that the name was assumed by the sect in order to give it a show of apostolic standing (Eusebius, Hist. iii. 29). Some modern critics incline to think that the name is allegorical (Nicolaus, 'conqueror of the people,' nearly equivalent to Balaam, Rev. 2:14), and that it marks a tendency rather than a definite sect.

Nicolas, SAINT (d. 326), patron saint of Russia, was bishop of Myra in Lycia. He is regarded as the patron saint of merchants and of travellers by sea and land, but also especially of the young and of scholars. Hence his festival was formerly celebrated in the English schools, and he still survives in the Santa Claus of

Christmas rejoicings.

Nicolas, Sir Nicholas Harris (1799-1848), English antiquary, was born at East Looe in Cornwall. The results of his researches in history, genealogy, and kindred subjects were chiefly embodied in A Synopsis of the Peerage of England (1825), Chro-nology of History (1835), History of the Orders of Knighthood of the British Empire (1841-2), Dispatches and Letters of Nelson (1844-6), and History of the Royal Navy (unfinished, 1847).

Nicole, PIERRE (1625 95), French Jansenist author, born at Chartres. Coming into collision with the religious authorities, he in 1679 found a refuge in Flanders, but four years later was again in Paris. He was an able dialectician and controversialist. Among his works is Essais de Morale (later ed. 14 vols., with Life by Goujet, 1767-82). He was also the chief author of the Port-Royal La Logique.

Nicoll, WILLIAM ROBERTSON (1851), Scottish author and critic, was born at Lumsden, Aberdeenshire. He was minister of the Free Church at Dufftown (1874-7). and at Kelso (1877-85). In 1886 he went to London, became editor of the Expositor, and started the British Weekly, and in 1891 established the Bookman, both of which journals he continues to edit. Among his works are titerary Anecdotes of the Nine-teenth Century (1895), Life of James Macdonell (1890), The Re-turn to the Cross (1897), Letters on Life (1901), The Church's One Foundation (1901), The Garden of Nuts (1905), and The Daybook of Claudius Clear (1905). He also originated and edited The Ex-positor's Bible (vol. i. 1897, vol. ii. 1900), The Clerical Library, The Theological Educator, The Household Library of Exposition, the British Monthly (since 1900), a complete edition of the Works of C. Brontë (1902), and is joint-editor of an Illustrated History of English Literature.

Nicolson, WILLIAM (1655-1727), English antiquary and divine, born probably at Plumbland, Cumberland; occupied the sees of Carlisle (1702-18) and Derry (1718-27), where he showed himself not free from nepotism. His chief work, the Historical Library, consists of three sec-tions—English, Scottish, and Irish. Though containing many

mistakes, it is of great value.

Nicol's Prism. See POLARIZ-

ATION OF LIGHT.

Nicomedia, anc. city in Bi-thynia, Asia Minor, at E. end of Sea of Marmora, was founded by Nicomedes I. in 264 B.C., and became a colony under the Romans. Several of the later emperors, notably Diocletian and Constantine the Great, made it a frequent It was there that residence. Hannibal died and Arrian was born. See ISMID.

Nicopolis. See Nikopoli. Nicopolis, city of Epirus, opposite to Actium; was founded by Augustus to commemorate his victory at Actium in 31 B.C. The victory at Actium in 31 B.C. The question of St. Paul's visit is bound up with the authenticity

of the Pastoral Epistles.

Nicosia. (1.) Or LEFKOSIA,
tn. and cap., isl. of Cyprus, in
E. Mediterranean, 23 m. N.W. of the seapt. Larnaca. It was originally fortified by Constantine. In 1193 Richard Cour de Lion presented it to Guy de Lusignan, whose capital it became. Within the walls are two fine old cathedrals (now mosques); outside are the government house, the prison, and an English church. Nicosia is the seat of a Greek archbishop. Silk and cotton goods and leather are manufactured. Pop. (1901) 14,752. (2.) Town, Sicily, on Monte San Giovanni (2,800 ft.), 25 m. N.E. of Caltanissetta. is a bishopric, and has a salt mine and sulphur springs. Pop. (1901) 15,811.

Nicot, JEAN, SIEUR DE VILLE-MAIN (1530-1600), was born at Nimes, and was ambassador from Francis II. of France to Lisbon. There he obtained from a Flemish merchant seeds of the tobacco plant, and carried them back with him to France (1560), where the plant was named Nicotiana. He was the author of a Historia Francorum (1566), and the compiler of one of the first French dictionaries (1606). See rolle's Jean Nicot (1897). See Falgai-

Nicotera, Giovanni, Baron (1828-94), Italian statesman, born at San Biase (Calabria); formed an early connection with the party of Young Italy, and fought in the patriot army (1848-9). Captured in 1857, he was condemned to life-long servitude in the galleys, but was set free by Gari-baldi. He held the portfolio of the interior under Depretis (1876–77), and again under Rudini (1891–92). See Life, in Italian, by Giordano (1878); Mauro's Biografia di G. Nicotera (1886); and Mario's In Memoria di Giovanni Nicotera (1894).

Nicotiana, a genus of mostly the order Solanacea. They are natives of America and the Pacific islands. They bear salver-shaped or infundibuliform flowers, in terminal panicles or in long, uni-lateral racomes. Much the most important species is N. tabacum, the common tobacco, a downy herbaceous plant, from 3½ to 4 ft. in height, with lanceolate leaves, racemes of pinkish flowers.

Nicotine, C₁₀H₁₄N₂, a di-acid alkaloid occurring in the tobacco plant, from which it may be obtained by distilling the extract with lime. It is an oil (sp. gr. 1'01) that boils at 250° C., turns brown in air, is soluble in water and alcohol, and has a peculiar, stupefying odour. On oxidation it yields nicotinic acid, and in constitution is a pyridine derivative. Nicotine is very poisonous. Even in minute quantities it causes vomiting, purging, and collapse. The effects of tobacco-smoking are largely due to the nicotine present; a degree of tolerance of the drug is, however, soon acquired.

Nictheroy, cap. of state Rio de Janeiro, Brazil, on Bay of Rio, opposite the capital. It consists of Praia Grande, the commercial quarter, and Icaratry, a favourite bathing place. Pop. 20,000.



Nictitating Membrane. Right eye of tawny owl (1), showing nictitating membrane (n); and right eye of man (2), showing plica semilunaris (ps).

Nictitating Membrane, or THIRD EYELID, a structure best developed in birds, where it fulfils the function which in mammals is carried out by the freely movable upper eyelid, with its fringe of hairs—this function being the cleaning of the surface of the eye. It is moved by special muscles, and may be observed in

the living bird as a thin film which is constantly tlicked across the eye. In mainmals generally the third eyelid is only slightly de-

veloped.

Niebuhr, Barthold Georg (1776-1831), German classical scholar, was born at Copenhagen. He was for a time secretary to the Danish minister of finance, and then travelled in Great Britain, and spont a year in Edinburgh. In 1799 he became assessor to the East India de-partment of the Board of Trade in Copenhagen. In 1804 he became chief director of the National Bank, and in 1806 removed to Berlin to take up a similar appointment. But in 1810 he became royal historiographer and professor at Berlin. He then began his lectures on Roman history, the first two volumes of which were published in 1812 (ed. Schmitz, 1893). In 1816 he went to Rome as Prussian am-bassador. At Verona he discovered the MS. of the Institutes of Gaius. In 1823 he retired to live at Bonn. The first two volumes of his *History of Rome* were republished in 1827 and 1828; a third, bringing the history to the end of the first Punic war, appeared after his death (Eng. trans. 1847-51). His history has been superseded by later works, especially by that of Mommsen; but it was epoch-making both in its rejection of the legendary element in early Roman history, and in its reconstruction of the early political and social developments and institutions. As a narrator of events and portrayer of character he was less successful. See Hensler's Lebensnachrichten (1838; Eng. trans. by Winkworth, 1852), and Eyssenhardt's B. G. Niebuhr (1886).

Niebuhr, KARSTEN (1733-1815). German traveller and author, was born at Lüdingworth (Hanover). A member of an expedition sent out by the king of Denmark in 1761, he returned in 1767 as its sole survivor. The fruit of his journey appeared in his Beschreibung von Arabien (1772), Reisebeschreibung von Arabien und andern umliegenden Ländern (1774-8), and Reisen durch Syrien und Palästina (1837). He also collected and published the notes of his friend Forskal on the natural history of the former regions. See *Life* by his son, B. G. Niebuhr (1817; Eng. trans. by Mrs. Austin, in Lives of Emi-

nent Persons, 1833).

Niederwald, mountain ridge (1,150 ft.), on r. bk. of Rhine, between Rüdesheim and Assmannshausen. Its southern slopes are covered with vineyards. Opposite Bingen, where the Rhine makes a bend to the N., is the National Monument, a memorial of the Franco-German war of 1870-1. It is a colossal bronze figure of Germania, 341 ft. in height, standing on a pedestal 82 ft. high, a magnificent work by the sculptor Johannes Schill-

ing, unveiled on Sept. 28, 1883. Niel, ADOLPHE (1802-69), French marshal, born at Muret (Haute-Garonne); gained distinction in Algeria (1836-7), and directed the siege operations against the Roman republic in 1849. As chief of the French engineers in the Crimea, he directed operations at the siege of Sebastopol. For distinguished service in the Italian campaign of 1859 he became marshal of France. Appointed minister of war in 1867, he was reorganizing the army when he died. The well-known yellow rose is named after him.

Niello, the engraving of metals, chiefly silver, with designs filled in with a metallic amalgam; the word also connotes tracings on paper, taken from metal plates, the art of line engraving being thus discovered, it is suggested, by Tommaso Finiguerra (1452). Benvenuto Cellini was the last great niello worker. The art great niello worker. The art flourished at Byzantium, in Ireland (unrivalled from 10th to 12th century), France, Italy (Venice), and Germany. Russia has preserved and inherited Byzantine skill; and her platina boxes, and the bidri work (silver on niello ground) of Bedar in Haidarabad, India, represent the art to-day.

Nielsen, Yngvar (1843), Norwegian historian, born at Arendal; became director of the ethnographical museum at Christiania (1878), and in 1890 professor at the university. His principal works are Norges Historie efter 1814 (1882-92), Kieler-freden (1886), Der Vertrag von Moss und die Schwedisch-Norwegische Union (1895), and monographs on the history of the Hanseatic League in Bergen. He is the author of the best guide to Norway (Eng. trans. 1899). Niembsch von Strehlenau.

See LENAU.

Niemen. See MEMEL.
Niemes (Czech, Mimon), tn.,
Bohemia, Austria, 11 m. by rail
S.E. of Böhmisch-Leipa. It has a castle of the Counts Hartig, and produces linen and cotton goods, cloth, bentwood furniture, and chemicals. Pop. (1900) 6,024.

Niepce, Joseph Nickphore (1765-1833). French chemist, born at Chalons-sur-Saône; was one of the inventors of photography, constructing the pyréolophore and other apparatus. In 1827 he associated himself with Daguerre, and discovered the means of reproducing spontaneously images received in the camera, and out of this grew photography.

Nierembergia, a genus of mostly creeping American herbaceous plants, belonging to the order Solanaceæ. They bear graceful flowers, with more or less infundibuliform corollas, violet or white in colour.

Nierstein, vil., grand-duchy of Hesse-Darmstadt, Germany, on 1. bk. of Rhine, 9 m. by rail s.s.E. of Mainz. It is a wine-growing centre, large quantities of Niersteiner being exported annually. There is also a sulphur spring in the neighbourhood. Pop. (1900) 4,127.

Nietzsche, Friedrich Wil-HELM (1844-1900), German moralist, was born at Röcken, near Lützen. He gained a professor-Lützen. He gained a professorship at Basel at twenty-five, but resigned it in 1879; finally (1889) he became insane. Schopenhauer in philosophy and Wagner in art were at first his accepted guides, though both alike fell later under his sweeping condemnation. There are, according to Nietzsche, two fundamental ethical types: on the one hand, the morality of slaves or the weak among mankind, who favour all the virtues that suit their weak-ness, and who would fain depreciate the virtues of the strong; on the other hand, the morality of the strong, of the masters, who stand above the common herd, and have no need of their base utilitarian virtues. Christian morality belongs to the former type. It is only by the morality of the strong that men -that is to say, the few, the masters-can rise to a higher stage, that of the Uebermensch, who will be as high above the ordinary man of to-day as the latter is above the beast. Thus Spake Zarathustra (a work not wanting in poetic conception and epigrammatic force) and others of Nietzsche's works have been translated into English (1899, etc.). See Life, in German, by E. Förster-Nietzsche (1895-1904). and by F. R. Richter (1904).

Nièvre, cen ral dep. of France. bordered on the w. by the Middle Loire. It was formed out of the ancient province of Nivernais. The river Nièvre (tributary of the Loire) washes its chief town, The surface is hilly, Nevers. almost mountainous, the main range being the Morvan in the s.E., the watershed between the Seine and Rhone systems. soil is not very fertile, and the chief wealth lies in minerals and in forests. The department yields iron, coal, and kaolin, with manand china. There exist remains of hundreds of Gallo-Roman forges. Area, 2,658 sq. m. Pop. (1901) 323,783. ufactures of cutlery, hardware,

Niflheim. See MYTHOLOGY

-Northern.

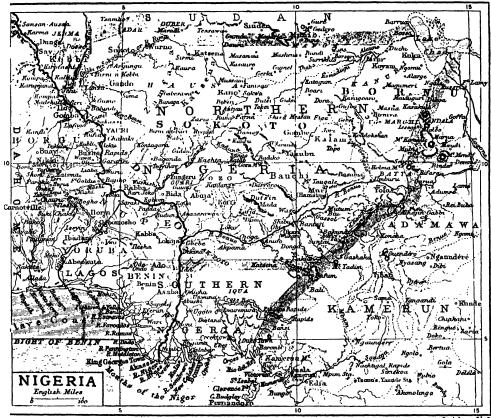
Nigdeh, or NIGDE, tn., Konieh vilayet, S.E. Asiatic Turkey, 68 m. N.N.W. of Adana; fine buildings of Seljuk period. Pop. 20,000.

Nigella, a genus of Asiatic and S. European annual plants belonging to the order Ranunculaceæ. They bear white, yellow, or blue flowers, and, under the names of love-in-a-mist and devilin-the-bush, are cultivated in British gardens.

Niger, the third in length of the rivers of Africa, about 2,600 annual inundation. Here it receives on the right bank the one important tributary of the upper basin—the Bani, or Bagoe. After taking a s.e. direction it is known as the Kwara, and in N. Nigeria receives from the E. the Benue, its largest tributary. By the most eastern branch, the Mayo Kebbi, it receives part of the flood water of the Shari basin. Of the deltaic arms the main one is the Nun, to the E. of which are the Brass, New Calabar, Bonny, Opobo, and

troops in Syria declared him emperor. But he was twice defeated by Severus—first near Nicæa, in Bithynia, and again in Cilicia, on the Gulf of Issus; and after the capture of Antioch he fled towards the Euphrates, but was brought back and executed.

Nigeria, the British territory the Lower Niger. In 1884 the first definite territorial rights were acquired by the National African Company. The coast districts developed into the Niger



m. long, and with a basin of 584,000 sq. m. The main upper branch takes its rise only 150 m. from the w. coast of Africa. This, the Joliba, flows generally N.E., until it approaches 17° N., when it turns sharply E. and afterwards S.E. and S., and finally enters the Gulf of Guinea by a vast delta after completing a great bend concave to the S. In about 13° 45′ N., soon after passing the town of Segu and the ruins of Sansanding, the river enters a region of swamps, lakes, and backwaters, which continue to near Timbuktu, and are subject to

others. On the w. is the Wari, which enters the sca by the Foorcados mouth. The Kwara forms many rapids, especially between Ansongo and Say, and below the town of Bussy.

The modern exploration of the river began with Mungo Park (who was drowned in the Bussa rapids), and was continued (among others) by Clapperton and Lander (the latter of whom first actually traced the lower course), Barth, Toutée, Hourst, and Lenfant.
Niger, GAIUS PESCENNIUS, Ro-

man emperor in 193 A.D. On the death (193) of Commodus, his

Coast Protectorate, while the interior (with a portion of the coast region) was placed under the company, which acquired a charter in 1886 as the Royal Niger Company. The frontiers were defined by the treaties of 1893 (with Germany) and 1898 (with France; modified in 1904); while in 1900 the rights of the company were transferred to the British crown, the whole British territory (400,000 sq. m.; pop. 25,000,000) being divided into the two protectorates of Northern and Southern Nigeria, separated by an E. and W. line in 7° 10' N. In 1903 Lagos was incorporated with

the latter. Since 1900 British authority has been extended over the greater part of N. Nigeria, the obstructive emirs of Sokoto and Kano being overthrown by a military expedition in 1903. The coast region is low-lying, humid, and unhealthy. Farther inland the country becomes clothed with dense forest; while just below the confluence of the Niger and the Benue a line of hills marks the beginning of the interior plateau, which rises in parts to 2,500 ft. The plateau country is cultivated with millet and other grains, cotton, indigo, and leguminous plants, the Bassia Parkii, or 'shea butter-tree,' being also much grown. The climate of the plateau region is much drier, and great variations of temperature (high by day and low by night) occur when the harmattan blows from the northern deserts. The coast dwellers are typical pagan negroes, while the Fulani and Hausas of the north are distinctly higher races. The Fulani came into power under Othman Dan Fodio early in the 19th century, and still form the ruling caste. Constitutional government has been developed among them to an extent unusual in Africa. The Hausas are an industrious, enterprising, commercial people. There are many large towns, including Sokoto, Surmi, Kano, Zaria, Bauchi, Kontagora, Bida, Keffi, and Yola on the Benuc. Kano is the great market of this part of Africa -cotton-cloth, kola nuts, kino, hides, gum arabic, and indigo being among the chief commodities dealt in. The centre of the British administration is at Zungeru, on the Kaduna; and other important centres are Lokoja, at the confluence of the Niger and Benue, and Ibi, on the Benue. The eastern part of the protectorate is formed by the old kingdom of Bornu, inhabited by the Kanuri. In S. Nigeria the chief centres are Akassa (on the main mouth of the Niger), Bonny, New Calabar, Brass, Old Calabar or Duke Town, towards the E.; Warri, Sapele, and Benin, to-wards the w. The principal pro-ducts are palm oil and kernels, rubber, cotton, and timber. Total imports (1904) for N. and S. Nigeria, £2,317,000; exports, £1,871,000. See Robinson's Nigeria (1900), Mockler-Ferryman's British Nigeria (1903), and Partridge's Cross River Natives (1904). See also Southern Nigeria.

Night, the interval between sunset and sunrise. At the equinoxes it is of twelve hours' duration all over the earth; then lengthens in one hemisphere as it shortens in the other, until the solstices, when the process is reversed. Within the Arctic and Antarctic circles the night of

mid-winter exceeds twenty-four hours, and the excess grows with latitude until a six-months' night is attained at the poles.

Night - blooming Plants are plants whose flowers open or become fragrant as night draws in, closing, dying, or ceasing to yield fragrance at the approach of day. Most of these flowers are fertilized by moths or other insects of the night. Among the common examples are the large white-flowered evening primrose (Enothera taraxic ifolia), originally imported from America; the old double white rocket (Hesperis matronalis), or damask violet: the nightscented stock (Hesperis tristis); and Silene nutans, a native British catch-fly, which may occasionally be seen growing on limestone rocks. This plant bears many large white flowers during June and July, cach flower living but for three nights. Almost a shrub in size, the marvel of Peru (Mirabilis jalapa) is one of the handsomest of night-blooming plants, opening its flowers at about eight o'clock, and closing them again for good and all before three o'clock the following morning. It is a somewhat delicate plant, and will only thrive in warm soils and sunny situations. The sand verbena (Abronia fragrans), a Californian perennial of fairly vigorous trailing habit, produces beautiful flowers of purest white, which yield a vanilla-like fra-grance at night. Several of the thorn apples or daturas can easily be grown as half-hardy annuals in Britain. The mauve-tinged white trumpets of *D. ceratocaula* are especially handsome. The soapwort (Saponaria oficinalis) bears large rosy flowers which open and become fragrant much after the manner of those of Silene nutans. The ephemeral blossoms of the night-flowering cactuses-Cereus grandiflorus with its vanillascented brown and yellow flowers, often measuring a foot across, and C. nycticalus, known as the queen of the night—open at about nine o'clock and begin to wither some six hours later, and are only produced under glass.

Nighthawk, a name given to the British nightjar. See NIGHT-

Night-heron (Nyeticorax), a comparatively small bird, very widely distributed over the globe; one species, N. griseus, visits Britain. It reaches a length of twenty-three inches, and the greenish plumage is smoother and more compact than in the ordinary heron. The head region bears three or more long white plumes. Like the other species, this night-heron haunts wooded districts, preferably in the vicinity of water. The nest is built in

bushes or low trees, and the eggs are from three to five in number. Rarely flying in the daytime, the birds become active and clamorous at night. In China the bird is regarded as sacred.

Nightingale (Daulius luscinia), a passerine bird famous for its beautiful song. It winters in Africa, as far south as Abyssinia and the Gold Coast, and breeds throughout Central Europe. It arrives in England about the first or second week in April, the males . preceding their consorts by some days. In the British Isles it is found in south and Midland England, but does not occur in Devon-shire, nor, generally speaking, in Wales. To the north it sometimes reaches Yorkshire, but is virtually unknown in Northumberland, and has never been recorded in Scot-land or Ireland. The sexes are alike in plumage. The upper surface is russet-brown, deepening into chestnut on the upper tail coverts and tail, the under surface grayish-white, deepening to buff on the flanks and breast. The total length is six and a half



Nightingale.

inches. The nest is begun early in May, and the song of the male is heard only until the young are hatched in June. The eggs are uniformly brown, and are from four to six in number; a colour variety is, however, known in which they are blue-green mottled with brown. The food consists of worms, insects, and berries, and the birds haunt especially woods in the vicinity of water or damp meadows. It is stated that the males will live in captivity if taken before the arrival of the females—i.e. before pairing. The males sing by day and by night in fine weather, but the song has always attracted most attention at night. In the eastern parts of Europe the common nightingale is replaced by the somewhat larger sprosser (D. philomela), whose song is stated to be inferior. Another species (D. Hafizi) is found in Persia, and is the bulbul of Persian poets.

Nightingale, FLORENCE (1820), the pioneer of trained army nursing, was born at Florence. She went through a course of training at the Protestant Deaconesses' Institute at Kaiserswerth in Germanny, and subsequently studied French methods in Paris. Returning to England, she reformed the management of the sanatorium for governesses in Harley Street, London. When the reports of the sufferings of the troops in the Crimea reached England she sailed (October 1854) for Scutari. There she toiled until the British troops left the



Florence Nightingale.
(Photo by London Stereoscopic Co.)

town, in July 1856. Her nightly rounds of the wards, so eagerly awaited by the soldiers, won for her the title of the 'Lady with the lamp.' The feeling of the nation found expression in a gift of £50,000, with which Miss Nightingale founded the training home for nurses which bears her name. Her Notes on Nursing appeared in 1858. She reported on the Army Medical Corps and its work in the Crimea. See Life by Tooley (ed. 1905).

Nightjar, Goatsucker, or Nightjar, Goatsucker, or Nightjar, a curious bird of the family Caprimulgidæ (or suborder Caprimulgi). It has a short, broad beak, an enormous gape, large eyes, and a loose, owl-like plumage. The birds are usually nocturnal in habits. The British nightjar or fein-owl (Caprimulgus euroneus) is a migratory species, which breeds throughout the greater part of the Continent. It reaches a total length of ten and a half inches, and the dark plumage is beautifully mottled and spotted. The food consists of insects, and the eggs are laid on the bare ground. Other species of the same or related genera are widely distributed over the globe, and often receive special names from their cries—e.g.

the whip-poor-will (C. virginianus) of Virginia. To a different sub-family belong the wood nightjars (Nyctibius) of tropical Amer-



ica, characterized by the peculiar 'powder-down' patches on the breast and sides. In association with the nightjars some authorities place the frog-nouths.

Nightmare, or INCURUS, a disturbance of sleep, sometimes associated with a feeling of intolerable weight in the epigastrium and with intense terror. Nightmare may generally be traced to an error of diet, and is most apt to occur in those who have weak digestion, or in those who are out of health. In many cases an after-supper dose of an antacid, such as sodium bicarbonate, acts as a prophylactic against nightmare.

Nightshade, a name given to various, usually shrubby or subshrubby, plants, mostly belonging to the order Solanacea. The woody nightshade or bittersweet, which is a common British hedge plant, is Solanum dulcamara. (See BITTERSWEET.) Another common British plant is the



Nightshade (Solanum nigrum).
1, Corolla, opened; 2, stamen; 3, pistil and calyx.

black nightshade (S. nigrum), which occurs on waste ground as an annual herbaceous plant, with drooping umbels of white flowers in late summer, the flowers being followed by black berries. The young shoots of the woody nightshade yield an alkaloid called dulcamarin, which was formerly used in medicine. The so-called deadly nightshade (Atropa Belladonna) is comparatively rare in Britain. It is a rather tall herbaceous plant, with large oval leaves and solitary pendulous campanulate purple flowers, followed by large black berries not unlike cherries in appearance. It is the source of the drug belladonna and of the valuable alkaloid atropine. The common enchanter's nightshade, which we generally meet as a weed in damp gardens, is a species of Circaa (C. lutetiana). It bears dentate oval leaves and clusters of very small white flowers, with hairy calyces and pinkish stamens.

Nigra, CONSTANTINO, COUNT (1827), Italian statesman, born near Ivrea; distinguished himself in the Austro-Italian war of 1848. As secretary to Cavour, he displayed so much ability that he was sent as ambassador to Paris (1861). He held the same post at St. Petersburg (1876-82), London (1882-5), and Vienna (1885). He has published Cantipopolari piemontesi (1895).

Nihilism is sometimes used as if synonymous with anarchism, but it is better confined to the manifestations of social and political discontent in Russia. It is true that some of the most noted nihilists have been anarchists; and with the exception of Proudhon, most of the leading anarchists have been Russian by birth-e.g. Herzen, Bakunin, Kropotkin. Further, anarchism as a theory seems to suggest itself to the Russian mind spontaneously when attention is directed to the constitution of society. Nihilism, as a practical movement, aims at the destruction of the existing government by every means practicable, by violent and underhand methods if necessary. Its exponents have been chiefly university graduates and undergrad-uates. Nihilism did not manifest itself till about 1858, and was for thenext decade rather an inchoate movement; but the 'boom' which socialism experienced in the sixties in Germany and France promoted the growth of nihilism in Russia. Hitherto the police had not troubled the movement much; but many arrests were made in 1873, and thousands came under police surveillance. national movement, which resulted in the Russo-Turkish war in 1877-8, gave a check to the growth of nihilism. But in 1878 Vera Sassulitch attempted to assassinate General Trepoff, and initiated that long duel, carried on with ruthless severity by the

police, and with almost superhuman skill and cunning by the nihilists, which ended in the death of Czar Alexander II. in 1881. The Czar had been condemned by the nihilist committee as tar back as 1878. The practical ends tor which the nihilists work are freedom of the press and of speech, local self-government for the towns, religious equality, a democratic and permanent parliament, and the land for the p. ople. See Stepniak's Underground Russia (1883); Nihilism as it is, mostly by Stepniak (1895); Turgeniev's novels, Fathers and Sons (1862) and Smoke (1872).

Niigata, cap. of Echigo prov., W. Hondo, Japan, 150 m. N.W. of Tokvo. A relief port has been into the upper city and the lower city. The former of these (150 to 250 ft. above the Volga) contains the Kreml, or citadel, and most of the historical buildings; the latter lies at the foot of the high ground. In the Kreml are the cathedrals of the Transfiguration (founded in 1227) and of the Archangel Michael (founded in 1222), the governor's palace, the tower of Prince Dmitri (1374, rebuilt in 1896), the tower of the Czar Ivan III. (1500), the arsenal, a military cadet school, and the law courts. In the extreme w. of the upper town is the convent of the Annunciation, founded in 1221. Just outside the Kreml is the tiny but extremely picturesque eathedral of the Annunciasque cathedral c

Nike, in ancient Greek legend the goddess of victory, called Victoria by the Romans. In works of art Zeus and Athena are often represented as holding her in their hands. She carries a wreath or a palm, and has

wings.
Nikko, tourist resort and place of pilgrimage, Hondo, Japan, 91 m. by rail N.W. of Tokyo, in a lovely mountain district 2,000 ft. above sea-level. Its Buddhist and Shinto shrines are unrivalled for claborate wood-carving and brilliant colour work. Copper is mined.

Nikolaevsk, tn., Samara gov., E. Russia, 105 m. S. s.w. of Samara city, on r. bk. of Great Irghiz, a trib. of Volga. Its manufac-



Nijni-Novyorod.

formed in the island of Sado. Coarse lacquer ware is manufactured, and there are coal and petroleum. It has a good college. Pop. (1898) 53,366.

Nijar, tn., Almeria, Spain, 15 m. N.E. of Almeria, Lead, iron, and phosphates are mined. Iron ware, cotton, and woollen goods are manufactured. Pop. (1900) 12.497.

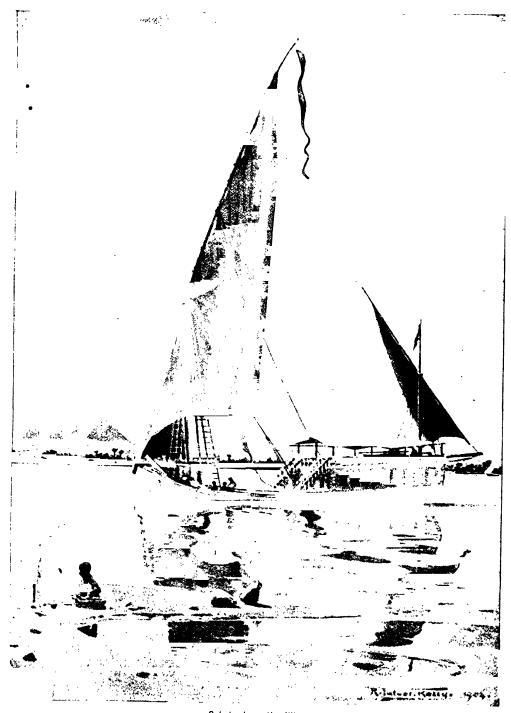
Nijni-Novgorod, tn., Central Russia, seat of one of the greatest of European fairs, cap. of gov., 240 m. E.N.E. of Moscow, at junction of the rivers Oka and Volga. It is divided into two main parts—the permanent town, on r. bk. of Oka and Volga; and the temporary or 'fair' town, on l. bk. of Oka. The former is divided

tion, founded in the 14th century. In the 'fair' town (July 15 to September 10) merchandise of £24,000,000 worth is annually brought to market, and some 400,000 traders and visitors swell the population of the city. Here are the cathedral of St. Alexander Nevskii finished in 1881; the old cathedral, built in 1822; the central railway station; and the Armenian church. The principal industrial establishments are flour mills, metal foundries, machine works, and distilleries. Nijni-Novgorod was founded in 1212, and became the capital of a separate principality in 1350. It was sacked by the Tartars in 1377, and united to Moscow in 1392. Pop. (1897) 95, 124.

tures include tallow, tobacco, sheepskins, and bricks. Pop. (1897) 12,524.

Nikolaiev, tn., port, and naval station, Kherson gov., S. Russia, 40 m. N.w. of Kherson city. It is a large and handsome modern town, and is fortified. It has an Orthodox cathedral, Admiralty buildings, an observatory (1821), and a school of navigation. The dockyards and naval arsenal are important, and there are industries of rope, tallow, tobacco, and candles. It is, with Sebastopol, the principal naval station of Russia on the Black Sea. Pop. (1897) 92,060.

Nikolaistad, tn. and port of W. Finland, cap. of Vasa prov., 235 m. N.N.W. of Helsingfors.



Dehabeah on the Nile.

A dehabeah is a decked passenger boat used on the Nile, having a sharp prow and broad stern,

Its industries include iron foundries, glass works, and shipping. Its annual exports are valued at about £160,000, and are principally oats, tar. timber, butter, fish, rye, pitch; imports are estimated at nearly £450,000. Pop. (1897) 12,384.

Nikolsburg (Czech, Mikulov), tn., Moravia, Austria, 26 m. s. of Brünn. In the centre of the town rises a rock with a castle of the Princes Dietrichstein. Viticulture flourishes. Bethlen Gabor, by a treaty concluded here with the Emperor Ferdinand II., in 1622, renounced the title of king of Hungary; and the preliminaries of peace between Prussia and Austria were signed here in 1866. Pop. (1900)

Nikopoli, or NICOPOLIS, and th., Bulgaria, on r. bk. of Danube, 24 m. N.N.E. of Plevna, in a good wine-producing country. It is commanded by a citadel, and has an old castle and a Byzantine church. Here Sigismund of Hungary was defeated by the Turks in 1396; and near here the Russians defeated a Turkish fleet in 1829. In 1877 the Russians nearly destroyed the place.

Nikosia. See Nicosia. Nile, a British second class battleship (11,940 tons) launched in 1888. The name was introduced into the navy in 1800.

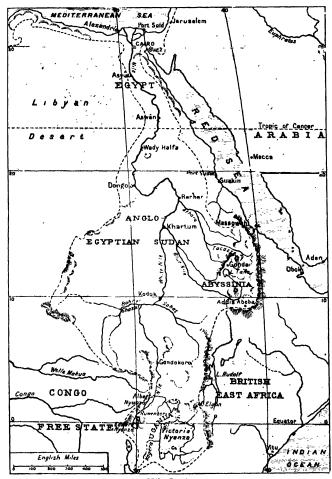
Nile, BATTLE OF THE. ABOUKIR.

Nile, river of Africa. From time immemorial its source was a mystery. It is now known to have its farthest source in the Nyavolonga and the Akanyaru, headstreams of the river Kagera, which rises between 2° and 3° s., and enters the w. side of the Victoria Nyanza. After passing through this lake, the river proceeds N. as far as Gondokoro (5° N.), where it is joined by the Bahr-el-Ghazal and the Sobat from the Galla highlands; from this point to Khartum it is called the Bahrel-Abiad, or White Nile. Here it is joined by the Bahr-cl-Azrek (Blue Nile), and the united stream flows on in a long, narrow valley to Cairo, where the delta begins, and thence to the Mediterranean After leaving Khartum it receives only one tributary, the Atbara, which drains the north-ern highlands of Abyssinia, and falls into it about 180 m. below Khartum. The Nile is one of the three longest rivers in the world, being about 4,000 m. in length; and but for two great interruptions, it is navigable for its entire course. Between Wady Halfa and Khartum there are five cataracts, or rather series of rapids. Until 1902 there was a cataract at Assouan, but this has been done away with by the construction of the great reservoir

and dam at Shellal. The Libyan desert lies to the w., and the Arabian and Nubian deserts to the E. of the river.

In former days the Nile discharged itself into the sca through seven mouths-the Kanopic, Schennytic, Tanitic, Mendesian, Pelusiac, Bolbitine, and Phatmitic. It is by the last two that the river finds its outlet today, though they are now known

three months the overflow continues, reaching its maximum in September, when it remains practically stationary until towards the end of October: there is a temporary rise of a few days, and after this it slowly but steadily subsides. The Nile floods depend on the rainfall of the Abyssinian highlands. In 1770 Bruce discovered the sources of the Blue Nile in Lake Tana in Abyssinia.



Nile Basin.

as the Rosetta and Damietta branches. Once every year the Nile overflows its banks, and deposits upon the land a black and very fertilizing mud, upon which the very existence of all the crops in Egypt depends. About the end of April the rise is perceived at Khartum, but it is not until to-wards the end of June that its effects are felt at Cairo. During

In 1858 the Victoria Nyanza was discovered by Speke, and in 1889 the Albert Edward Nyanza by Stanley. Most of the informa-tion on the Nile is scattered through official publications and books relating to Egypt, the Anglo-Egyptian Sudan, and the Lake Region of Central Africa. Among these are Sir H. H. Johnston's The Nile Quest (1904); Report on Perennial Irrigation and Flood Protection for Egypt (1894); Report on the Nile and Country between Dongola, Suakin, Kassala, and Omdurman (2nd ed. 1898); H. G. Lyons's Physiography of the River Nile and its Basin (1906); Wood's Egypt under the British (1896); White's The Expansion of Egypt (1899); Will-cock's The Nile Reservoir Dum at Assuan and After (1901); and Hayes's Source of the Blue Nile (1905).

Nile and Red Sea Railway, line between Berber on the Nile and the new harbour of Port Sudan, 45 m. N. of Suakin, on the Red Sca, opened in January 1906.

See SUDAN.

Nile Province. See UGANDA. Niles, tn., Trumbull co., Ohio, U.S.A., on Mahoning R., 58 m. s.E. of Cleveland; has manufactures of steam and electric cars, iron roofing, and incandescent lamps. Iron and coal are mined.

Pop. (1900) 7,468. Nilgai, or Nylghau (Boselaphus tragocamelus), an antelope which is confined to India. male is about 4½ ft. in height at the withers. The fore limbs are the withers. The fore limbs are longer than the hind, and the back in consequence slopes backwards. Both sexes have a short mane, and the male possesses a throat-tuft and short, smooth, and nearly straight horns. The bull is dark gray in colour, the young and females brown. The head and females brown. The head region bears white markings, while the under surface is also white, and there is a white band above each fetlock. The animals haunt comparatively open ground, and, where they have not been much hunted, are said to be fearless. They are readily tamed, but the bulls tend to be savage. In the wild state the bulls seem to live singly or in small parties, separate from the females and young, which occur in small herds, sometimes accompanied by a single full-grown bull.

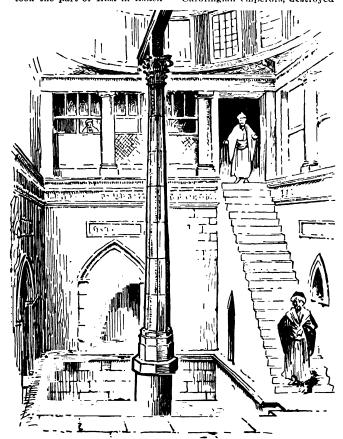
Nilgiri or Nellgherry Hills (i.c. Blue Mountains), an almost isolated plateau, at s. extremity of Deccan, Madras Presidency, India, forming the converging point of the E. and W. Ghats, and coming within 40 m. of the W. coast. It rises abruptly to the height of 6,500 ft., its highest peak, Mt. Dodabetta, reaching 8,760 ft. Area of dist., 957 sq. m. Pop. (1901) 111,437.

Nilometer, ancient construction for measuring the height of the Nile. One constructed by Caliph Suleiman (715-717 A.D.) stands on the island of Roda, south of Cairo, and consists of an octagonal pillar graduated to 17 cubits of 21'386 in., standing in a square well 16 ft. deep. When the river has risen 153 cubits, irrigation is begun. Another is on the island of Elephan-

tine, near the first cataract.
Nilsson, Christine (1813), Swedish soprano vocalist, born near Wexiö. She made her dé-but in the Théatre Lyrique at Paris (1864), and came to England (1867), where she continued to appear nearly every season until her retirement. Besides operatic engagements in St. Petersburg. Moscow, and Vienna, she made successful tours in America. She took the part of Elsa in LohenIndore. Pop., including canton-ment (1901), 15,398.

Nimbus. See AUREOLE, CLOUD.

Nimeguen, NIJMEGEN, or NYMWEGEN, tn., Netherlands, prov. Gelderland, on l. bk. of Waal, 11 m. by rail s. of Arnhem. The principal church (1272) contains a fine monument to Catherine of Bourbon (d. 1469). There are remains of the Valkhof, a place of residence of the Carolingian emperors, destroyed



Nilometer on the Island of Roda.

grin on its first production in London (1874), and was the creator of important rôles in various operas. Her voice had a compass of about two and a half octaves, from G to D in alt, and was of great sweetness, evenness, and brilliancy throughout. She retired from the operatic stage (1881), and from the concert platform in 1888.

Nimach, tn. and British cantonment in territory of Gwalior, Central India, 134 m. N.W. of

by the French in 1796. The chief industries produce tobacco, metal wares, and beer. The Noviomagus of the Romans, Nimeguen was strongly fortified down to 1877-84. Here treaties of peace were signed between Spain, France, Austria, and the Nother-lands (1678 9). Pop. (1900) 42,756. Nîmes, chief tn. of dep. Gard, France, lies midway between

France, lies midway between Montpellier and Avignon, on the south-eastern slopes of the Ccvennes. It manufactures shawls,

velvet-pile carpets, silks, and wine and brandy. It is an episcopal see, and possesses a modern cathedral and a citadel. old town has narrow streets and picturesque houses. Nîmes (Roman Nemausus) possesses wellpreserved and most interesting monuments of Roman architecture. Its glory is its amphitheatre (? 138-161 A.D.); it is now utilized for public entertainments, and occasionally for The Maison Carrée bull fights. The Maison Carrée (now turned into a museum, and containing Paul Delaroche's masterpiece, Cromwell gazing on the Headless Corpse of Charles 1.) was one of the most elegant Corinthian temples in the Roman world. The fine public garden contains a large reservoir, once a Roman bath; and near it is the Nymphæum ('Diana's tem-ple'). Nimes can also boast a mausoleum and two magnificent Roman gates; while the aqueduct of Pont du Gard, 14 m. to the N.E., originally terminated in Nimes. The town was the birthplace of the historian Guizot (1787) and of the novelist Daudet (1840). The place was the centre of the rebellion of the Camisards early in the 18th century. Pop. (1901) 80,605.

Nimrod, a son of Cush, and a great hunter, is described as having possessed the cities Babel, Erech, Akkad, and Calneh, in the land of Shinar or Babylonia (Gen. 10: 8-10). He founded the Assyrian Tetrapolis (Asshur, Nineveh, Rehobothir, and Calah). He is identited by some Assyriologists with Izdubar or Gilgamesh, the principal hero of the Babylonian Izdubar legends, or 'Ninrod Epic.'

Nimrod, pen-name of Charles James Apperley.

Nineteenth Century, monthly magazine, founded in 1877, and since edited by Mr. (now Sir) James Knowles. Its purpose was 'the unfettered and unbiassed discussion of all topics of public interest by authors signing their own names.' An introductory own names.' An introductory sonnet was written for the first number by Lord Tennyson, who contributed other verses, such as The Flect, from time to time. Mr. Gladstone was also a frequent contributor, both as a literary critic and as a controversialist; and it was in the Nincteenth Century that he and Huxley conducted the famous controversy on Genesis. An influentially signed protest against the Channel Tunnel appeared in the Nineteenth Century in 1883, and Gladstone declared that it killed the scheme. At the be-ginning of the 20th century the title of the review was changed to The Nineteenth Century and After.

Nineveh, tn. on E. bk. of Tigris, opposite the modern Mosul. Rehoboth-Ir (Gen. 10:11) is supposed to be the Rebit Ninua of the inscriptions, which was seemingly an extension of the city to the north-east. The ruins consist of the remains of a wall about 7 m. in circumference, broken next the Tigris by two large mounds or palace-platforms, Kuyunjik, the

has yielded, among other things, the splendid series of hunting scenes now in the British Museum, and the largest collection of Assyrian inscriptions known. The mound of Nebi-Yunus ('the Prophet Jonah') has not yet been thoroughly explored, but it is known to contain palaces of Sennacherib and Esarhaddon, his son, and seems to have been the place where military stores were



Winged Bull from Nineveh. In British Museum.

rarger mound, has the ruins of two palaces. That to the south was apparently an old structure, enlarged by Sennacherib, who decorated its walls with elaborate illustrations of his campaigns, as the siege of Læchish and the setting up of his winged bulls at Nineveh. This palace was destroyed by fire, and most of its glories consumed. The northern palace, built by Assur-bani-pal.

kept. Explorations were made for the British Museum in 1903-5. The date of the foundation of Nineveh is doubtful; but as the city, with its great temple of Istar, E-mesmes, is mentioned by Hammurabi in his code of laws, it must have been of considerable antiquity, dating probably from the beginning of the third millenium B.C. See Layard's Nineveh (1849), Nineveh and Babylon

(1853); Rassam's Assur and the Land of Nimrod (1897); G. Smith's Assurian Discoveries (1875).

Ning-po, city and treaty port in Che-kiang prov., China, 12 m. from the sea. Rice, cotton, varnish, oils, sepia, and bamboos are its chief products. Large fishing fleets rendezvous in the neighbourhood. Ning-po is noted for its wood-carving and embroideries, and has a high literary reputation. The Portuguese founded a settlement here in 1522, which was exterminated in 1545. The town was taken by the British in 1841, and occupied until May 1842, when the port was opened to foreign trade. Net value of trade (1905), £2,927,685 (exports, £925,325; imports, £2,002,360). Pop. (1901) about 255,006,

Ninian, SAINT (d. 432?), one of Scotland's earliest apostles. Consecrated bishop to the western parts of Britain, he established his diocese at Whithorn in Galloway, and in 397 built there what is stated to have been the first stone church in Britain, the see of Galloway being known as 'Candida Casa'—i.c. white house (chapel). Ninian subsequently endeavoured to convert

the Southern Picts.

Ninon de l'Enclos. See LEN-CLOS

Niobe, a British first - class cruiser of 11,000 tons, launched at Barrow in 1897.

Niobe, in ancient Greek legend, was the wife of Amphion, king of Thebes. According to Homer's story, she was so proud of her twelve children that she scorned the goddess Leto, who had only given birth to Apollo and Ar-temis. To punish her they slew all her children, and the gods turned Niobe into a stone on Mt.

Sipylus in Asia Minor.

Niobium, or Columbium, Nb or Cb, 94, a very rare metallic element, occurring chiefly in nio-bite. The element itself has been prepared by reduction by carbon in the electric furnace, and is a gray metal (sp. gr. 7.1) that burns in chlorine. It forms an acidic oxide, Nb₂O₅, from which the salts known as niobates are derived.

Niort, tn., cap. of dep. Deux-Sèvres, France, 254 m. by rail s.w. of Paris. Its nursery gardens and glove industry are famous. Niort contains a beautiful Gothic church (1491-1534), and an old castle in which Mme. de Maintenon was born. (1901) 23,897.

Nipigon, lake, Ontario, Canada, 30 m. N.W. of Lake Superior. Area, 1,450 sq. m.; it is studded with over a thousand islands.

Nipissing, lake, Ontario, Canada, between Ottawa R. and N.E. of Lake Huron. It is 50 m. long and 20 m. broad, and is connected with Lake Huron by French R. (55 m. long), which empties itself into Georgian Bay. It is a noted resort for sportsmen.

Nippon, or NIPHON, a name for the Japanese empire, but wrongly limited by foreigners to the main island, Hondo. Dai Nippon is 'Great Japan.'

Nippon Yusen Kaisha, or JAPANESE MAIL STEAMSHIP, the chief steamship line of Japan. It was originally founded in 1876 as the Three Diamonds Company, which undertaking pur-chased the Shanghai-Yokohama service of the Pacific Steamship Company of London. In 1882 it was amalgamated with the Union Navigation Company under the present title, and the service now comprises regular lines to Antwerp and London, Seattle (for the United States), Australia, China, Russia, India, and the principal ports of Japan. The fleet numbers 70 vessels, having an aggregate tonnage of 235,555. The largest vessel is 235,555. the Tango Maru, of 7,200 tons.

Nippuru. See Babylonia. Nirvana, the 'earthly paradise' of Buddhism, is that perfect condition which a Buddhist attains when, having conquered his passions, he becomes sinless, and can view with calmness and indifference the world, its sin, and its turmoil-a state of perfect peace and rest. Nirvana is synonymous neither with the Christian ideal of a future state nor with annihilation; it is attained in this world and in this life. Death - or according to Buddhism transmigration-is the result, or reward, of Nirvana.

Nisard, Jean Marie Napolkon Désiré (1806-88), French literary historian, born at Chatillon-sur-Scine; became professor at the Collège de France in 1843, and was elected to the French Academy in 1850. His chief works are Etudes de Mœurs et de Critique sur les Poètes Latins de la Décadence (1834), Histoire de la Littérature Française (1844-61), Renaissance et Réforme (1855), and Les Quatre Grands Historiens Latins (1874).

Niscemi, tn., prov. Caltanis-setta, Sicily, Italy, 30 m. s.e. of Caltanissetta. In 1770 it suffered severely from earthquake. Pop. (1901) 14,748.

Nish, or Nis, tn., Servia, on the Nisava, 130 m. s.e. of Bel-grade, the seat of a hishop, with a fortress; in ancient times was capital of Upper Mæsia. It was the birthplace of Constantine the Great, and was long a bone of contention between Hungarians and Turks. Pop. (1900) 24,451.
Nishapur, in., Khorassan, N.E.
Persia, 48 m. w.s.w. of Meshed,

with turquoise mines 36 m. N.W. In the town is the tomb of Omar Khayyam, who was a native. Pop. 15,000.

Nisibis, also called ANTIOCHIA MYGDONIE, an ancient city of Mesopotamia. It figured in the wars of Rome with the Parthians and the Persians, but was finally

captured by the Persians in the reign of Julian (363 A.D.).

Nisi Prius. The judges of the King's Bench Division of the High Court, when they hear jury trials in London, are said to sit at nisi prius. The Statute of Nisi Prius (13 Ed. 1. c. 30) enacted that the sheriff should summon jurors in any action to the court at Westminster, unless first (nisi prius) a judge of assize should come to the county where the cause of action arose.

Nitella, a genus of green Alga, belonging to the class Characeæ. They are slim-habited submerged water plants, rooted in the ground, and growing erect in patches. Their life history is closely similar to that of Chara.

Nith, riv., S. Scotland, rises 9 m. s. of Cumnock, Ayrshire, flows 71 m. s., and enters the

Solway Firth.

Nithsdale, WILLIAM MAXWELL, FIFTH EARL OF (1676-1744), was engaged in the Jacobite rebellion of 1715, and was taken prisoner at Preston, sent to the Tower, and sentenced to death in 1716; but through the agency of his wife he succeeded in escaping from the Tower in female dress. An account of his escape, written by the countess, appears in vol. i. of Trans. Soc. of Antiquaries in Scotland.

Nitrates. See NITROGEN. Nitre, or SALTPETRE, KNO3, occurs as an incrustation of the soil in hot and dry climates. further under POTASSIUM.) Cubic nitre is sodium nitrate.

Nitric Acid, or Aqua Fortis. See NITROGEN

Nitric Oxide. See NITROGEN. Nitrification, the process by which nitrogenous organic matter is oxidized to nitrous and nitric acids. It is brought about by the agency of a minute bacillus. first stage in the process is the conversion of the organic matter into ammonia (which may be effected by an independent organism), the ammonia being oxidized first to nitrites, and then to nitrates---free access of oxygen and the presence of a base, such as calcium carbonate, to neutralize the acids as formed, being The process occurs in essential. every fertile soil, and is intimately connected with its crop-producing power. It has also producing power. It has also been utilized on the Continent artificially as a source of potassium nitrate.

Nitriles, the cyanides of the alkyl radicles, constituted R-C-N. Nitriles are prepared either by the action of the alkyl potassium sulphate or the alkyl iodide on potassium cyanide, or by heating the ammonium salts of carboxyl acids with a dehydrating agent, such as phosphorus pentoxide. Nitriles are ethercal-smelling liquids which when hydrolyzed yield an acid and ammonia.

Nitrites. See NITROGEN.

Nitro-benzene, oil of mirbane, C₆H₃NO₂, is prepared by slowly adding ten parts benzeneto a mixture of thirteen parts concentrated nitric acid, with eighteen parts concentrated sulphuric acid, contained in large iron water-cooled cylinders. After the action the acids are separated from the oily layer, which is then distilled. The portion boiling about 200° C. represents the nitro-benzene. Nitro-benzene is a pale yellow liquid (sp. gr. 1°18, m.p. 3° C., b. p. 209° C.). It smells like bitter almonds,

and is poisonous. It is used to scent soaps, but most of it is con-

verted to aniline by reduction. Nitro-cellulose, the product of the action of nitric acid on cellulose. Several products are produced according to the concentration of the acid, none of which, however, are really 'nitro' derivatives, but are rather the nitric acid esters, or nitrates, of cellulose, which is of an alcoholic nature, containing six hydroxyl groups. Thus gun-cotton, $C_{12}H_{14}O_4(ONO_2)_6$, is obtained where concentrated nitric acid mixed with sulphuric acid is the reagent; while weaker acids yield a mixture of the tetranitrates and pentanitrates, which, though combustible, is not explosive, and dissolves in ether-alcohol, forming collodion. See Gun-cotton. COLLODION, and CELLULOID.

Nitro-compounds are hydrocarbon derivatives containing -NO2 groups. They differ much according as to whether they are derived from the fatty or aromatic series; the latter yields by far the most important nitrobodies. The nitro-paraffins are obtained by the action of the alkyl halides on silver nitrite, and are stable ethereal-smell-ing liquids, which on reduction yield amines. The nitro-derivatives of the aromatic series are far more important than the nitro-paraffins, and are formed by the action of nitric acid on the hydrocarbon acid or other compound into which it is desired to introduce the group, the readiness of introduction being dependent on the strength of nitric acid, temperature, time of action, and nature of compound acted on. Aromatic nitro-derivatives are yellow, usually solid and crystalline volatile bodies that are liable to explode on heating, and on reduction yield amines, such as aniline.

Nitrogen, N, 14'04, a gaseous element that occurs free in the atmosphere, of which it forms about four-fifths. All living things contain it as an essential ingredient, and it also occurs largely in the nitrates of sodium and potassium, and in ammonia. Nitrogen may be prepared from the air by combining the oxygen with which it is mixed with some easily oxidizable substance. Thus, if a piece of phosphorus is floated on a slice of cork, set on fire, and covered with a jar of air, the oxygen unites with the phosphorus to form phosphorus pentoxide, which dis-solves in the water, leaving the nitrogen fairly pure. A bag of wet iron filings acts in a similar way, but more slowly; or the air may be passed through a tube packed with copper turnings and heated red hot. In all these cases the nitrogen obtained contains about 1 per cent. of argon. If ammonium nitrite, obtained by mixing ammonium chloride and potassium nitrite, is heated, nitrogen is set free, $NH_4NO_2 = N_2 +$ 2H₂O. Ammonia is also a convenient source, the hydrogen being oxidized by sodium hypobromite, $3NaBrO + 2NH_3 = NaBr$ $+3H_2O+N_2$, or by oxygen itself by passing the mixed gases through a red-hot tube, $4NH_3 + 3O_2 = 2N_2 + 6H_2O$. The latter plan is very conveniently modified by using air instead of pure oxygen, when the nitrogen of the air is added to that of the ammonia. In this case the tube is best packed with copper to stop any excess of oxygen. Nitrogen is a colourless, odourless gas that liquefies at - 195.5° C., and solidifies at - 213° C. The liquid has a specific gravity of 79, and the solid, at the boiling-point of hydrogen, of 1026. Chemically, nitrogen is comparatively inert in general, not readily uniting with other elements. It combines, however, with magnesium and calcium when heated with these metals, forming nitrides, and with oxygen to form nitrogen peroxide, if a mixture of the gases is subjected to electric sparks. These reactions are made use of to separate argon from the nitrogen of the air. Though not readily entering into combination directly, nitrogen is a component of a number of compounds of the highest natural and industrial importance. Of these, the hydride, ammonia, NH₃, is one of the chief, both in itself, its salts, and the derivatives in which organic radicals replace more or less of the hydrogen. The latter substitution products include such widely differing substances as methylamine, glycocoll, ani-line, the alkaloids, and pyridine. The oxides of nitrogen and

their derivatives are also exfive in number-viz. nitrous oxide, N₂O; nitric oxide, NO; nitrous anhydride, N₂O₃; nitronitrous annyuriue, NO, 203; nitro-gen peroxide, NO, or N2O4; and nitric anhydride, N2O5. Of these, nitrous oxide, or 'laughing gas,' is prepared by gently heating ammonium nitrate, NH,NO3= $N_2O + H_2O$, and is a colourless gas with a faint sweetish smell. It liquefies at - 90° C. at atmospheric pressure, or under a pressure of 36 atmospheres at 0° C., and is somewhat soluble in water. Wood, phosphorus, and strongly burning sulphur burn in the gas almost as brightly as in oxygen, but feebly burning sulphur is extinguished, so that decomposition into oxygen and nitrogen probably precedes combustion. Nitrous oxide, when inhaled, causes an anæsthesia, though the effects soon pass off; the gas is often employed thus in minor operations, such as teeth extrac-tion. If inhaled diluted with air, a sort of mild intoxication is produced; hence the name 'laughing gas.' Nitric oxide is prepared by the partial reduction of nitric acid. Thus, if copper is acted on by nitric acid diluted with an equal volume of water, and the copper nitrate drained off as it forms, almost pure nitric oxide is obtained, $3Cu + 8HNO_3$ = $3Cu(NO_3)_2 + 4H_2O + 2NO$. Nitric oxide is a colourless gas that liquefies at - 154° C. and is only slightly soluble in water. It unites spontaneously with oxygen, forming the red gas nitrogen peroxide, and supports combustion in a way similar to but less vigorously than nitrous oxide. Nitrous anhydride, or nitrogen trioxide, is formed by the union of nitric oxide and nitrogen peroxide at a low temperature, $N_2O_4 + 2NO = 2N_2O_3$, and is an indigo-blue liquid that readily dissociates into the above components. It unites with ice-cold water to form nitrous acid, N₂O₃ + H₂O = 2HNO₂. Nitrogen peroxide is prepared by heating lead nitrate, 2Pb(NO₃)₂ = 2PbO + 4NO₂ + O₂, or reducing nitric acid by arsenious anhydride in the presence of concentrated sulphuric acid, and condensing the gases in a freezing mixture. At - 12° c. it forms colourless crystals, which melt to a pale yellow liquid that boils at 22° c. The gas formed becomes darker and gas formed occomes united and darker red as the temperature rises, dissociation of N₂O₄ molecules into NO₂ taking place, N₂O₄ ≥ 2NO₂. With water it N₂O₄ ≥ 2NO₂. With water it yields nitrous and nitric acids, $N_2O_4+H_2O=HNO_2+HNO_3$. Nitric anhydride, or nitrogen pent-oxide, is obtained by dehydrating concentrated nitric acid with phosphorus pentoxide, and forms

colourless volatile crystals, that are very unstable and unite with water to re-form nitric acid, $H_2O + N_2O_5 = 2HNO_3$. Of the acids derived from the oxides of nitrogen, nitrous acid forms a blue solution that readily breaks up on warming, $2HNO_2 = H_2O + NO + NO_2$. It behaves as a monobasic acid, forming a series of somewhat unstable salts, the nitrites. Sodium and potassium nitrite are the chief of these, and are tough, crystalline solids, prepared by reducing the corresponding nitrates by heating with lead, $KNO_3 + Pb = PbO + KNO_2$. trites set free iodine from iodides, reduce permanganates, and are chiefly employed in bringing about the 'diazo-reaction' much used in the preparation of organic compounds such as dyes. Nitric acid, or 'aquafortis,' is prepared by heating potassium nitrate, or commercially sodium nitrate, concentrated sulphuric with concentrated sulphuric acid, $NaNO_3 + H_2SO_4 = NaHSO_4$ + HNO3. On the large scale the mixture is heated in iron cylinders, and the nitric acid evolved is condensed in Woulff's bottles or earthenware worms. The product is usually coloured more or less yellow from the presence of nitrogen peroxide, but can be decolourized by drawing air through it. Pure nitric acid is a fuming liquid of specific gravity 1 55, that boils at 86° C.; the commercial concentrated acid has a specific gravity of 142, and contains about 30 per cent. of water. The acid becomes yellow on exposure to light, owing to partial decomposition, and is a most corrosive liquid, rapidly destroying the skin and cloth, with the production of a yellow stain. It behaves as a monobasic acid, forming a very important series of salts - the nitrates -and has powerful oxidiz-ing properties. Thus it readily converts ferrous to ferric salts and sulphides to sulphates. reaction with ferrous salts is made use of to test for the acid, as the nitric oxide formed by its reduction gives an intense brown colour with the excess of the ferrous salt. With metals, hydrogen is not set free as with other acids, but is oxidized by the acid. which is simultaneously reduced to the various oxides of nitrogen, or even ammonia, according to the conditions of the experiment. Similarly, nitric acid oxidizes hydrochloric acid, yielding chlorine and nitrosyl chloride, HNO3 +3HCl = 2H₂O + NOCl + Cl₂, to the former of which the mixture owes its power of dissolving gold, and gets its name of 'aqua regia. Nitric acid is largely employed in the preparation of nitric esters, such as 'nitro-cellulose' and 'nitro-glycerin' for use as explosives, and for the preparation

of true nitro-derivatives, such as nitro-benzene. The acid is also used for etching and engraving, and for separating alloys of gold and silver. For the particular nitrates see the articles dealing with the various metals of which they are salts.

Nitrogen Peroxide. See NITROGEN.

Nitro - Glycerin, or, more correctly, GLYCEROL TRINITRATE, C₃H₅(NO₃)₃, is obtained by adding approximately one part glycerin to three parts nitric acid and five of sulphuric acid to produce two parts of nitro-glycerin. The mixed acids are put in a leaden vessel, and the glycerin is forced in in fine streams. A supply of compressed air can be blown in, and cooling worms are also provided to prevent the temperature rising above 30° C., as above this point dangerous decomposition may set in. After nitration the nitro-glycerin is separated by subsidence from the majority of the spent acid, then very thoroughly washed, and finally filtered. Nitro-glycerin is a pale yellow (colourless if quite pure) liquid, with a sweetish taste and poisonous action. It has a specific gravity of 16, and is almost insoluble in water. It freezes at 8' c., and evaporates on gentle heating. When pure it keeps well, though when containing impurities it may spontaneously decompose explosively. It is not easily set on fire, but if heated up, decomposes with detonation at 180° c.; and though it may be fired by shock, it is best exploded by a detonator containing fulminate of mercury, the explosion being very sudden and violent. It is never employed by itself as an explosive, but is usually mixed with kieselguhr to form dynamite, or with gun-cotton to form blasting gelatin. It is also used to a small extent in medicine in the treatment of some heart troubles.

Nitrous Acid. See NITROGEN., Nitrous Ether, or ETHYL NITRITE, C2H50NO, is a very volatile inflammable liquid, of strong apple-like odour and of pungent taste. It is prepared by heating ale hol with expper and nitric acid, and is a component of the 'sweet spirit of nitre' used in medicine.

Nitrous Oxide. See NITRO-

Nitzsch, Karl Emmanuel (1787-1868), German theologian, was born at Borna, near Leipzig, became a lecturer at Wittonberg in 1810, and a professor (in the pastoral seminary) in 1817. He was called to a chair at Bonn in 1822, and thence in 1847 to Berlin, where he laboured till 1863. He wrote System der Christlichen Lehre (1829; Eng. trans. 1849), and

System der Practischen Theologie (1847-67), but his strength lay nather in preaching and church politics. See Memoir, in German, by Boyschlay (1882).

by Beyschlag (1882).

Nitzsch, Friedrich August
Berthold (1832), son of Karl
Emmanuel, professor of theology
at Kiol, has written on Bocthius
(1860), on history of Christian
dogma (1870), and Luther und
Aristoteles (1883).

Niue, or Savage, a coral isl., 36 sq. m. in area, in S. Pacific, 19 '10' s., and 169' 47' w. It was annexed to New Zealand in June 1901. Copra and straw hats are exported. Pop. (1901) 4,079.

Nivelles (Flem. Nyvel), tn., prov. Brabant, Belgium, 18 m. s. of Brussels. The collegiate church of St. Gertrude is a magnificent structure (founded 645, rebuilt 1048). The town has nailway workshops. Pop. (1900) 11,645.

Nivernals, old prov. of Central France, very nearly corresponding to department of Nievre. It was created into a duchy by Francis I., and reunited to the crown at the revolution.

Nix and Nixie, male and female water beings in N. European legend. The commonest acceptation is that they were an amphibious race, having occasional intercourse with human beings, but not themselves human.

Nizami (1141-1202), Persian poet, was born at Tafrish, and resided at Genje, or Ganjah. He is one of the seven great poets of Persia, and the author of several great poems—The Storehouse of Mysteries, The Book of Alexander, Khosrau and Shirin, Majonia and Laila, and The Sven Fair Faces—known as 'The Five Treasures of Nizami.' See W. Bacher's Nizami (Eng. trans. by S. Robinson, 1873).

Nizam's Dominions. Sec HAIDARABAD.

Nizhni-Novgorod. See Nijni-Novgorod.

Njörd, the sea-god in Scandinavian mythology; not a bodily impersonation like Neptune, but the spirit of water and air. Ægir was the deity corresponding to Neptune. Njörd had a son, Frey, and a daughter. Frevia.

and a daughter, Freyja.

Noah, the hero of the deluge, was the son of Lamech, and the father of Shem, Ham, and Japheth, who were formerly regarded as the founders of the three families of the human race. Gen. 9:20 f. seems to imply that he was the first maker of winc. See Gen. 5:28 9:29, and Debuge.

Noah, THE BOOK OF, a Jewish appocalyptic writing, which, lost as an independent work, has been largely incorporated in the Book of Enochand the Book of Jubilees, and in a later Hebrew work known also as the Book of Noah.

Noailles, a noble family of France. ANNE JULES, DUC DE NOAILLES (1650-1708), held various posicions under Louis XIV. His chief successes were in Spain, in 1693 and 1694; but he is best "emembered by the share that he took in suppressing with great severity the rising of the Camisards, the Protestants of the Cevennes. - ADRIEN MAURICE, DUC DE NOAILLES and MARSHAL OF FRANCE (1678-1766), son of the above, was in the Council of Finances, and was dismissed by the Duke of Orléans for his opposition to the schemes of the adventurer Law. As a soldier he, in 1734, captured the fortress of Philipsburg, near the Rhine. But during the Austrian Succession war he was generally unfortunate. In June 1743 he was defeated by the Anglo-Hanoverian army at Dettingen.—Louis Antoine (1651-1729) was made archbishop of Paris in 1695 by the favour of Madame de Maintenon, and in 1700 was made a cardinal. He took some share in the suppression of the monastery of Port Royal, but subsequently came into conflict with the Jesuits. He opposed the bull Unigenitus directed against the Jansenists, and was in consequence out of favour with Louis XIV. at the time of that king's death (1715). He was again powerful in the councils of the regent, and used his authority against the Jesuits.—PHILLIPE, COMTE DE NOAILLES (1715-94), won distinction as a soldier in several campaigns. He was long in great favour at court; and his wife, first lady of honour to Marie Antoinette, was nicknamed 'Madame Etiquette' from her rigid application of formalities. —LOUIS MARIE, VICOMTE DE -LOUIS MARIE, VICOMTE DE NOAILLES (175) 1804), fought for the American colonies in the war of Independence, and upon the outbreak of the revolution it was on his proposal that all feudal rights and privileges were abolished (Aug. 4, 1789). He returned to France after the 'terror,' and was killed near Havana in Cuba, in a naval conflict with the British.

Noakhall, dist., Eastern Bengal and Assam, India, with an area of 1,644 sq. m., and population (1901) of 1,141,728. It produces rice and areca nuts. The capital is Sudharam (pop. 6,320 in 1901).

Nobel, ALFRED (1833-96), was born at Stockholm; went to Russia in 1842, and assisted his father in the construction of submarine mines and torpedoes, and in the manufacture of explosives, more particularly nitro-glycerin. In 1857 he took out a patent for a gasometer, and in 1859 for an apparatus for measuring liquids, and also an improved harometer.

In 1866 he invented the explosive compound dynamite. From the manufacture of dynamite and his inventions of smokeless powder and artificial india-rubber Nobel amassed a large fortune, which he left for the foundation of five annual prizes, of about £8,000 each, to be awarded for the most important discoveries in (1) physics, (2) chemistry, and (3) physiology or medicine; for (4) the most remarkable work of an idealist tendency, and for (5) the greatest service to the cause of peace during the year. The benefits of the foundation are open to all nationalities without restriction even of sex. The first four are awarded by the Swedish Academy, and the fifth by the Norwegian Storthing. The recipients since 1901 have been as follows:--

Perugia, Italy, 20 m. E. of Perugia. Pop. (1901) 7,848.

Noctiluca, a genus of flagellate Protozoa, whose members are the chief cause of phosphorescence in British scas. It has a well-developed flagellum, by means of which it moves, in addition to a smaller one. The protoplasm is reticulated, like that of a vegetable cell. The light is said to be evolved from the layer of protoplasm which underlies the cuticle.

Nocturn. In the Roman breviary the Psalms are divided into portions called nocturns, which were originally recited at midnight. They now form a part of matins, and are introduced at about the same place as the Psalms in the Morning Prayer of the Anglican Prayer-book.

(1.)	(2.)	(3.)	(4.)	(5.)
1901Röntgen.	Van't Hoff.	E. von Beh- ring.	Sully Prud- homme.	
1902 Lorenz. Zeemann.	E. Fischer.	R. Ross.	Mommsen.	E. du Commun. A. Gobat.
1903 Becquerel. Curie & Mme. Curie.	Arrhenius.	Finsen.	Björnson,	W. R. Cremer.
1904Lord Ray- leigh.	Sir William Ramsay.	Pavlov.	Mistral. Echegaray.	Institute of Inter- national Law.
1905Lenard of Kiel,	Von Bäver of Munich.	R. Koch.	H. Sienkie- wicz.	Baroness Bertha von Suttner.

Nobile Officium, the equitable jurisdiction of the Court of Session. There has never been in Scotland a distinct separation between law and equity, or between courts of law and courts of equity; but the Court of Session has always possessed and exercised an inherent jurisdiction to entertain equitable considerations, and to adapt its forms of action to any state of facts, sons to provide a remedy for every case.

Nobility. See PEERAGE.
Noble, a coin, manufactured of
gold, in the reign of Edward III.,
and originally of the value of
6s. 8d. The value rose to 10s.
under Henry VI. and Edward IV.
Half-nobles and quarter-nobles
were also current.

Noble, SIR ANDREW (1832), British naval captain, became secretary to the Committee on Rifled Cannon in 1858, and to that on Plates and Guns in 1859. He has also been assistant-in-spector of artillery (1859), member of the Ordnance Select Committee on Explosives. In 1860 he joined the firm of Sir W. G. Armstrong and Co.

Armstrong and Co. Nocera. (1.) N. DE' PAGANI, tn., prov. Salerno, Italy, 10 m. N.w. of Salerno, on river Sarno. It is a bishopric, and has, with Nocera Superiore, where there is a church of Sta. Maria, dating from the 4th century, a population (1901) of 27,745. (2.) N. UMBRA, tn. and bishopric, prov.

Nocturne (Ital. notturno), a species of musical composition which owes its origin to John Field (b. 1782), and has been perpetuated by Chopin in many beautiful examples. It is now used as a title for almost any form of short pianoforte composition of a soft and dreamy nature.



Noddy, a term applied to Anous stolidus, and to other members of the same genus of tropical terms. They are especially characterized by the graduated tail, the fourth pair of tail feathers being the longest. See Term.

Node, one of the two points at which the orbit of a heavenly body intersects a fixed plane. The right line joining them is called the line of nodes. In the solar system the plane of reference is that of the coliptic. At the ascending node the moving object passes from its south to its north side; at the descending node, from north to south. The longitude of the ascending node is one of six quantities, or 'ele-

ments, which determine a planet's motion. The lunar and planetary nodes regress at various rates owing to perturbations. Stellar orbits are computed with reference to the plane at right angles

to the line of sight.

Nodier, JEAN EMMANUEL CHARLES (1780-1844), French writer, was born at Besançon, and was compelled to leave Paris on account of a satire on Napoleon in 1802. He returned in 1814, and in 1823 was appointed librarian of the arsenal in Paris. Nodier himself was the first romantic (nonclassical) writer to be elected (1833) to the French Academy. He is best remembered now for his novels and short stories, the best of which are Stella (1808), Thérèse Aubert (1819), Smarra (1821), Trilby (1822), Histoire du Miettes (1832), and Franciscus Columna (1844). His Œuvres appeared in 13 vols. in 1832-41. See Life by Mennessier-Nodier (1867), and Correspondance Inédite de C. Nodier, ed. by Estignard (1876).

Noé, AMÉDÉE, COMTE. See

Снам.

Noel, SIR GERARD HENRY (1845), British vice-admiral, was born at Stanhoe, Norfolk. He became rear-admiral of the Mediterranean fleet (1898-9), and a lord of the Admiralty (1893-8). He commanded the home fleet, and was admiral-superintendent of the naval reserves from 1900 to 1903, and commander-in-chief on the China station (1903-5)

the China station (1903-5),
Noel, RODEN BERKELEY
WRIOTHESLEY (1834-94), English
poet and critic, was son of the
Earl of Gainsborough. He has
published Behind the Veil (1863),
Beatrice (1868), The Red Flag
(1872; 2nd ed. 1883), A Modern
Faust (1888)—all volumes of
verse; Livingstone in Africa
(1874); The House of Ravensburg,
a Drama (1877); A Little Child's
Monument (1881); A Philosophy
of Immortality (1882); Songs of
the Heights and Deeps (1885);
Essays (1886); and Life of Lord
Byron (1890); and he has edited
selections from Spenser and Otway's Poems. Influenced at first
by Shelley, Noel is original in his
later works, but is somewhat lacking in spontaneity and destitute
of dramatic quality, although a
sound critic. His Collected Poems
appeared in 1902.

Noetus (fl. c. 200 A.D.), a native of Smyrna, who promulgated the doctrine that the one God and Father could of His own free will be and do all things—e.g. even die upon the cross. His teaching was very similar to that of Praxeas (fl. 175-189) and the Patripassians. See MONARCHIAN-

Noga Hills, British dist., Eastern Bengal and Assam. Area, 5,710sq.m. Pop. (1901)102,402. It abounds in game. The inhabitants, the Nogas, are a semi-savage people, partly of Indonesian origin.

Nogent. (1.) N.-SUR-MARNE, tn., dep. Seine, France, 11 m. by rail E. of Paris, on outskirts of Bois de Vincennes. The painter Watteau died here in 1721. Pop. (1901) 10,586. (2.) N.-LE-ROTROU, tn., dep. Eure-et-Loir, France, 38 m. by rail w.s.w. of Chartres; has manufactures of hats. The ruined château of Sully still remains. Pop. (1901) 8,415.

Noisseville, vil., Lorraine, Germany, 5 m. E. of Metz, was the scene of the defeat of the French under Bazaine by the Germans, Aug. 31 and Sept. 1, 1870.

Nokes, JAMES (d. 1692), English actor, started in the profession by performing women's parts as a boy actor at the Cockpit in Drury Lane, London. Among his principal rôles were Sir Martin Mar-all (in Dryden's play), Sir Nicholas Cully, Sir Barnaby Brittle, Sir Davy Dunce, and Sosia, while he also played the fool to Betterton's Lear.

Nola, tn., prov. Caserta, Italy, between Naples and Bajano. Giordano Bruno was a native. Pop.

(1901) 14,511.

Nolana, a genus of S. American herbaceous plants belonging to the order Convolvulacea. They bear white or blue infundibuliform flowers, and are hardy in Britain.

Nöldeke, Theodor (1836), German Orientalist, was born at Harburg. His first work was Geschichte des Korans (1860), which won for him in 1859 the prize of the French Academy of Inscriptions. After acting as professor at Kiel (1868), he secured the chair of Oriental languages at Strassburg in 1872. Amongst his many valuable books are Die alttestamentliche Literatur (1868), Geschichte der Perser und Araber zur Zeit der Sasaniden (1879), Die semitischen Sprachen (2nd ed. 1899), Persische Studien (2 vols. 1888-92), Sketches from Eastern History (Eng. trans. 1892), Compendious Syriac Grammar (Eng. trans. 1904), Fünt Mo'allagat (1899-1900), and Beiträge zur semitischen Sprachwissenschaft (1904).

Nollekens, Joseph (1737-1823), English sculptor, was a native of London; resided many years at Rome, where he executed his groups Timocles before Alexander and Mercuny and Venus Chiding Cupid, as well as busts of Garrick and Sterne. He became an academician in 1772, and thereafter devoted himself chiefly to portrait busts. Among his other works were the monument to Mrs. Howard at Corby Castle, a statue of Venus, and monuments of Captains Manners, Bayne, and Blair in Westminster Abbey.

Notice Prosequi. In England when a criminal trial has been begun it can only be stayed by entering a notice prosequi—i.e. by entering on the record a statement that the prosecutor will proceed no further. The course is sometimes adopted when it is desired to call the accused as King's evidence, or when the case against the prisoner is so difficult and doubtful that a jury cannot be got to agree on a verdict.

Nome, tn., N. Alaska, U.S.A., on N. of Norton Sound, the centre of a gold-mining district discovered in 1899 Pop. 12 488

ered in 1899. Pop. 12,488.

Nomenclature is the systematic naming of things in any art or science or any branch of science. The method of Linnaus. whereby each animal or plant is known by the name of its genus followed by that of the species. is called binomial nomenclature. (See Classification.) Nomenclature, in chemistry, is only partially systematic, empirical names of former times, of common use, and indicative of origin, being extensively employed. Again, several systems or parts of systems of composing names exist, and in many cases the names formed according to them leave some ambiguity as to the exact com-position. In general, however, the names of substances in chemistry are based primarily on the names of the elements. Of the latter, those known from early times, such as tin, lead, or iron, usually indicate some attribute of the element. Thus, bromine signifies the bad odour, and phosphorus the luminous properties connected with these substances. The name mercury comes from the alchemic symbol, and gallium and germanium from the nationalities of their discoverers. In general, however, the tendency has been to terminate the name of a metal in jum. For the simple compounds, names are formed by combining the names of the elements present, changing the termination of the least metallic into -ide-r.g. common salt, NaCl, is called sodium chloride. This method is developed by using the prefixes mone = 1, di = 2, tri = 3, tetra = 4, penta = 5 to specify the number of atoms of the elements in the molecule, but the prefix is rarely inserted except in the case of the second element-e.g. P2O5 is called phosphorus pentoxide. In those cases where two compounds are formed by the union of the same elements in different proportions, the terminations -ous and -ic are sometimes employed instead of the numerical termination, -ous being used with the least and -ic with the most oxidized compounde.g. SnCl2 and SnCl4 are called stannous and stannic chlorides respectively. In compounds containing more than two elements, the naming is simplified by assigning special names to certain groups of atoms that pass through groups of atoms that pass through reactions without separating—e.g.—ClO is the hypochlorite,—ClO₂ the chlorite,—ClO₃ the chlorate, and —ClO₄ the per-chlorate groups; KClO₃ is potassium chlorate. In this class of group the prefixes and suffixes pass from hypo ite, through -ite, and -ate to per-ate with the in-crease of oxygen, but the terminations are not connected with any particular number of atoms -c.g. while -ClO₃ is the chlorate group, -SO3 is the sulphite. This system of special names for groups is also used for NH4. ammonium; and for the innumerable groups of organic chemistrye.g.-CH3, methyl; C6H5, phenyl; CH₃CO-, acetyl—as otherwise the names of such compounds would be too cumbrous for use.

Nominalism, the name by which one of the rival theories in the great medieval controversy as to the reality of universals (genera and species) is known. According to nominalism, only the individual is real -e.g. the man Socrates—while the species and genus (man and animal) exist only as general concepts or names, by means of which the points of resemblance between a number of distinct individuals are summarized in a single thought or designation. Nominalism in the narrower sense of the term refuses to admit that even a concept or idea in the mind can be really general, and argues that it is in the common application of the name that the generality really resides. The more moderate form of nominalism is known as conceptualism. The great champion of nominalism was Roscellinus, who gave offence to the ecclesiastical authorities by arguing that only the customary distinction of person and substance in the doctrine of the Trinity prevents the recognition of the three persons as also three individual substances—that is to say, three Gods—the unity being that of name only. Conceptualism was maintained by Abelard. But another champion, William of Occain, renewed the contest with realism in the later period. In modern philosophy nominalism was vigorously upheld by Hobbes and Berkeley. The latter's argument against conceptualism is well known. (See his Principles of Human Knowledge, introduction, s. 13.) But modern psychology, with its insistence on the function of the generic image, is not on Berkeley's side. See Ward's 'Psychology' in *Ency. Brit.*, vol. xx. pp. 76-7. Nonæ, or the NONES, in the ancient Roman calendar the ninth day (according to the Roman practice of counting inclusively) from the ides. As the Romans reckoned backwards, the nones fell on the fifth of each month, except in March, May, July, and October, when the ides were on the fifteenth, and the nones accordingly on the seventh.

Non-commissioned Officers. See SERGEANT and CORPORAL.

Nonconformity, the avowed and systematic renunciation of the worship and discipline of a church established by law. In England those who hold themselves aloof from the state church are generally known as nonconformists; in Scotland the ordinary name is dissenter; in Ireland, since the disestablishment of the church in 1871, neither name has any meaning. It is commonly agreed to date the origin of English nonconformity shortly after the reformation. The more extreme among the reformers-i.e. those who afterwards became known as Puritans -were not satisfied with the progress made in the reign of Edward VI., nor with the Act of Supremacy (the sovereign the head of the church) and the Act of Uniformity (establishing the Prayer Book) of 1559 (Elizabeth), and a secession took place in 1563. These objectors soon became a power in the country, though they were unable to ward off the severe measures of the Court of High Commission, led from 1583 by Whitgift, the primate. They expected better treatment under James I., in view of his Presbyterian up-bringing, but the conference at Hampton Court undeceived them. They gained, however, much political support as a result of the general misgovernment of the country under James and Charles I. The pernicious thing in their eyes then became Episcopacy itself. Hence, when they at length attained the supremacy in Parliament during the civil war, they abolished prelacy forthwith, and adopted the Presbyterian standards and polity as drawn up on Scottish models by the Westminster As-sembly. But the restoration (1660), with the Act of Uniformity (1662), prescribing episcopal ordination for all ministers, led to the expulsion of about a thousand Puritan clergymen from the church, and thus marks the be-ginning of nonconformity in its modern acceptation. Other repressive acts followed rapidly: the Conventicle Act (1664) inflicted penalties upon all who attended nonconformist meet-ings; the Five Mile Act (1665) forbade Puritan ministers to

come within five miles of a corporation. These, with the Act of Uniformity and the Corporation Act (1661), which required all magistrates and municipal officials to communicate in the Established Church, form what is known as the Clarendon Code. The Test Act (1673) extended the obligations of the Corporation Act to all civil and military officers, but was rather directed against Roman Catholics. Some relief was found under the next reign (James II.) in the Declarations of Indulgence (1687-8), which, however, were so obviously designed to benefit the Catholics that they but served to arouse further discontent. Finally, the Toleration Act (1689), under William and Mary, abrogated the more oppressive of the above statutes, though the Corporation and Test Acts remained in force

till the 19th century.

Almost from the beginning of the dissenting movement there had been two parties making respectively a less and a more thorough protest against episcopal government—viz. the Presbyterians and the Independents. During the civil war it almost seemed as if Presbyterianism might win the day, but the smaller body of Independents kept it in check, and under the commonwealth held the hegemony of dissent. Presbyterianism lingered in England for many years, but it gradually lost its evangelical note, and approximated to Unitarianism; the later Presbyterian Church of England had its origin in congregations of Scottish Presbyterians and their sympathizers. The Baptists had long formed a separate com-munity, and in 1730 they joined the Presbyterians and Independents in a non-corporate union under the name of the Three Denominations. The Quakers preferred to remain isolated, and the Unitarians were, of course, ineligible. But a sixth dissident body arose about the middle of . the 18th century in the Methodists, headed by John Wesley. In 1828 the Test and Corporation Acts were repealed; in 1836 marriages before the registrar or in dissenting chapels were legalized; the year 1871 saw the last of the University Tests; and in 1880 nonconformist ministers were empowered to officiate in parish burying-grounds.

In Scotland the long contest between Episcopacy and Presby-terianism was concluded by the establishment of the latter in 1690. The Episcopalians were thus reduced to the status of a dissident body; while the Cameronians, by their unflinching adherence to the full stipulations of the Covenants (abolition of

prelacy in the British Isles), forced themselves into a like position. The later 'secessions' were all more or less provoked by the settlement of ministers in parishes against the wishes of the people, the nominating power being the patron under the Patronage Law of Queen Anne (1712). Hence arose the Secession (1733) and Relief (1752) Churches, and later, within the church itself, the Evangelical and Non-Intrusionist party, which came out at the disruption (1843) as the Church of Scotland Free. The Secession and the Relief bodies (after various breaches and reunions) were amalgamated in 1847 as the United Presby-terian Church, and finally the latter joined the Free Church in 1900 as the United Free Church of Scotland. There is besides in Scotland a considerable body of Congregationalists (Independents), and a smaller number of Baptists.

In both countries dissent has become a great power. In home and foreign missionary labour, in Christian liberality, in evangelical zeal, it rivals, and in combined membership surpasses, the established churches. The Liberation Society, formed originally in 1844, represents the more aggressive side of dissent, and works for the disestablishment and disendowment of the state communions. The National Council of the Evangelical Free Churches (instituted 1892) was formed to safeguard the rights of nonconformists, and to promote their fellowship in religious work.

Non-jurors, THE, those clergy of the Church of England who, holding the theory of the divine right of kings, refused to take the oath of allegiance to William III. after the revolution of 1688. Archbishop Sancroft was the first non-juror, and he was in con-sequence deprived of his archbishopric. Bishop Ken was also a non-juror, and retired from his see. Other prelates who refused the oath were the bishops of Ely, Gloucester, Norwich, Peterborough, Worcester, Chester, and Chichester. Of the inferior clergy, at least four hundred joined the ranks of the nonjurors, some of the best known being Hickes, dean of Worcester, Charles Leslie, and Jeremy Collier. As time went on, however, many of the non-jurors conformed and recognized the new dynasty. But a considerable body, tynisty. But a considerable oxy, headed by Bishops Lloyd and Turner, who had held the sees of Norwich and Ely respectively, continued the schism. Oxford long continued to be the home of the non-jurors. See Overton's The Non-Jurors (1903).

Non-Metals, in chemistry, are in general brittle, devoid of the lustre of metals, are bad conductors of heat and electricity; form oxides that with water yield acids, are set free at the anode in electrolysis, and readily unite with almost all the other elements. The most important are argon, boron, bromine, carbon, chlorine, fluorine, helium, hydrogen, iodine, nitrogen, oxygen, phosphorus, selenium, silicon, and sulphur.

Non seq. (non sequitur), it does

not follow.

Non-suit. When a judge thinks that the plaintiff has shown no case to go to the jury e.g. when the evidence discloses no cause of action-he stops the case and orders judgment to be entered for the defendant - i.e. he non-suits the plaintiff. For-merly a plaintiff who wished to abandon an action could be nonsuited at his own request.

Nootka Sound, on w. coast, Vancouver I., British Columbia, Canada. It is 10 m. across, and has good anchorage. In 1788 an English settlement there was broken up by the Spaniards; an international question arose, which was peacefully settled in 1790.

Nopalea, a genus of tropical shrubs belonging to the cactus order. The only species of importance is N. coccinellifera, a native of the W. Indies. This is cultivated as a food for the cochineal insects. It grows to almost ten feet in height, and bears scarlet flowers. Nopaleas may be easily grown as stove plants.

Norbert (1082 1134), founder of the Premonstratensian order in Picardy in 1120, was born at Xanten, near Cleves. He was canonized in 1584 by Gregory XIII.

Nord, dep. of N.E. France, adjoining Belgium. In the north and centre (sometimes known as French Flanders) it is flat; but towards the S.E., across the Scheldt and approaching the Ardennes, it becomes hilly and fairly well wooded. French Flanders is almost one immense town. No part of France is so productive, so well cultivated, or so industrial (except the Seine department), or so densely peopled. The most valuable vegetable products are flax, sugarbeet, cereals, and oil-yielding plants. Nord possesses France's greatest coal-field, which centres round Valenciennes. Great seats of industry are the woollen towns of Tourcoing and Roubaix with its conditioning house; Lille and Cambrai for linens; while the names of Bouvines, Cassel, Malplaquet, Hondschoote, are of military interest. The inhabitants are half Flemings and half French-speaking Walloons. Area, 2,228 sq. m. Pop. (1901) 1,866,994.

Nordau, MAX SIMON (1849), German author, of Jewish de-scent, was born at Budapest, and has practised since 1880 as a physician in Paris. His principal books are The Conventional Lies of Civilization (Eng. trans. 1884), Paradoxes (Eng. trans. 1896), Degeneration (Eng. trans. 1895), and The Malady of the Century (1896). A disciple of Lombroso, he has endeavoured to apply his ideas in a keen and caustic criticism of the principal manifestations of modern life. He has also written novels, as A Comedy of Sentiment (Eng. trans. 1896), and The Drones must Die (Eng. trans. 1899), and plays-c.g. The Right to Love (Eng. trans. 1895), Doctor Kohn (1899), Morganatic (Eng. trans. 1904), and Mahâ-Rôg (1905). He has lately taken an active interest in the Zionist movement.

Norddeutscher Lloyd, steamship line inaugurated in 1856 by a service from Hamburg to Hull and London, a New York service vic. Southampton being established three years later. This was the basis of the present weekly service between Bremen and New York via Southampton and Cherbourg. Other services are maintained between Bremen and Hamburg and E. Asia and Australia; and by acquiring the Scottish Oriental Company and the East Indian Ocean Steamship Company in 1900, the Norddeutscher Lloyd maintains a service to Penang, Singapore, Labuan, and Manila. There are also a large Chinese coasting trade, and lines to Sydney rid the Carolines, and vid Batavia. The company owns a fleet of 117 steamors, aggregating 603,000 tons, and possesses some of the largest express steamers in the world e.g. the Kaiser Wilhelm II., which has a gross tonnage of 20,000 tons, and a speed of 231 knots, which made her maiden voyage to New York in the spring of 1903; and the Amerika, 22,500 tens, which made her first voyage in October 1905. A special feature in the Amerika was the successful establishment of a restaurant where all meals could be had à la carte.

Nordenfelt Gun. See Guns. Nordenflycht, CHARLOTTE (1718-63), HEDVIG Swedish authoress, born at Stockholm. Her first work was an elegy on the death of her husband, within a year of their marriage, entitled Den Sörjande Turturdufran (1743), which made her famous. She founded the society Utile dulci, and also published a poetical annual, Qvinligt Tankespel (1744-50). Her erotic verses display much feeling and tender-ness. Her collected works were edited by Hansellius (1852).

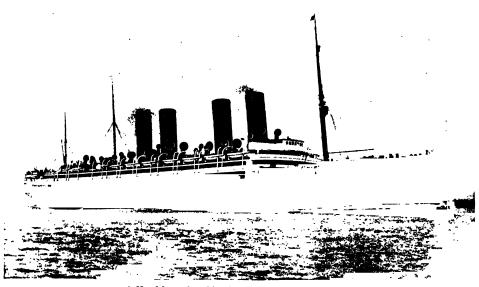
Nordenskiöld, Nils Adolf Erik, Baron (1832-1901), Swedish Arctic explorer, was born at Helsingfors in Finland. Sweden became his adopted country from 1857, and later he was appointed director of the Itoyal National Museum at Stockholm. In 1858 he was a member of Torell's expedition to Spitzbergen. He again accompanied Torell in 1861, and led expeditions to the same group in 1868 and 1872. In the former of these he pushed his vessel, the Sofia, as far north as 81° 42′, the highest latitude till then attained by any ship. In 1875 and 1876 he made voyages to the Yenisei. In the Vega he set sail in June 1878.

In 1900 he accompanied Amdrup to East Greenland; in 1895-7 he penetrated into the unknown interior of Tierra del Fuego, and visited Chile; and in 1901 he conducted to Louis Philippe Land in the Antarctic a Swedish expedition, which—the vessel, the Antarctica, having been crushed by the ice—was rescued by an Argentino expedition in 1903. In 1904-5 he made an expedition to the Andes, penetrated the northern forests of Bolivia, and studied the tribes along the headwater tributaries of the Amazons, in practically unknown districts. Dr. Nordenskiöld is the author of Frin Eldslande-i.c.

Brescia in Italy in La Traviata. Her Marguerite in Faust won high praise from musical critics, amongst them from Gounod himself. She made her first appearance in London in 1887.

Nördlingen, tm., prov. Schwaben, Bavaria, 72 m. by rail E. of Stuttgart. Two battles were fought here during the Thirty Years' war; in the first the Swedes were defeated (1634), and in the second (1645) the French under Condé defeated the imperial troops. Pop. (1900) 8,299.

Nore, The, sandbank at mouth of Thames, England, opposite the Medway. Off the eastern extremity is anchored (since 1732)



A Norddcutscher Lloyd Liner, Kaiser Wilhelm II.
(Photo by West, Southsea.)

and returned on April 24, 1880, having circumnavigated Eurasia, thus accomplishing the North-cast Passage. His last expedition was to Greenland, which he had visited in 1870. Nordenskiöld was a distinguished geologist and mineralogist. The Voyage of the Vega (Eng. trans.) appeared in 1881, and The Arctic Voyages of Adolf Erik Nordenskiöld, by A. Leslie, in 1879. He also published Faczinile Atlas (1889), and Periplus (1897). In 1887 he wrote an attobiography.

Nordenskiðid, NILS OTTO GUSTAF (1869), Swedish explorer, was born at Sjögelö in Småland, a nephew of Baron Nordenskiöld. In 1894 he was appointed lecturer in geology and mineralogy at Upsala University. Tierra del Fuego—(1898) and Antarctica (1905), in conjunction with J. G. Anderson.

North Sea, belongs to the Prussian prov. of Hanover, 8 m. long, 11 m. wide; area, 8 sq. m. It is connected at low water with the mainland. It is the most frequented of the German seaside resorts, with some 25,000 annual visitors. Pop. (1900) 4,018.

Nordhausen, tn., Prussian prov. of Saxony, 75 m. by rail E.N.E. of Kassel. Distilleries, tobacco, cigars, chicory, sugar, leather, wall-paper, and machinery factories. Pop. (1900) 28 407

ery factories. Pop. (1900) 28,497. Nordica, Madame (1859), stage name of Lilian Döme, American singer, who was born at Farmington, Maine, and made her début at

the Nore light vessel. The Great Nore is a stretch of deep water with good anchorage lying S.E. of the sandbank. The Little Nore is a similar stretch at mouth of Medway.

Norfolk. (I.) Maritime co., E. England. The coast is generally bordered (except at Cromer and Hunstanton) by low cliffs or sand dunes. Off Yarmouth a dangerous sandbank shelters the 'rosds,' in which ships find safe anchorage. The surface is level. The principal rivers are the Nene and Great Ouse in the W.: Little Ouse in the s., joining Great Ouse and flowing N.; and the Yare, joined by the Wensum, below Norwich, the Bure and the Waveney, all falling into the sea near Yarmouth. The Broads,

between Norwich and the sea, form a characteristic feature of the county. (See Broads.) There are many interesting churches, and in the N.W. is Sandringham, the country residence of Edward VII. Norfolk is one of the chief wheat-growing counties, and barley, oats, turnips, and mangold are extensively cultivated, as are also small fruits. The fisheries are important. Manufactures include silk, worsted (formerly flourishing), crape, and bombazine, boots and shoes, agricultural implements, and mustard. The county returns six members to Parliament.

This part of the country was in early times occupied by the Iceni; the Romans had here several stations (Caistor, near Norwich, etc.); and later it formed part of East Anglia, and was frequently ravaged by the Danes. Among later events may be noted the ravages of the Black Death in 1349; the rebellion headed by John Litester in 1381, and that under Kett in 1549. The sea is steadily encroaching on the coast. Area (anc. co.) 2,044 sq. m.; pop. (1901) 460,040. Area (admin. co.) 2,036 sq. m.; pop. (1901) 313,438.

(2.) City, Virginia, U.S.A., on Chesapeake Bay, at mouth of the James R., is an important port. Its exports amount to over two and a half millions sterling, mostly cotton. It manufactures fertilizers, lumber, hosiery, cotton, and silk. Pop. (1900) 46,624.
Norfolk, HENRY FITZ-ALAN

HOWARD, FIFTEENTH DUKE OF (1847), hereditary earl marshal and chief butler, and premier duke and earl of England, was born in London. He is the head of the English Roman Catholics, and was sent as special envoy to Pope Leo XIII. on the attainment of his jubilee in 1887. This was the first occasion on which an English envoy had been dispatched to the Papal Sec since 1687. The Duke Norfolk, who, in the Home Rule controversy, associated himself with the Liberal-Unionists, was made Postmaster-general in 1895. He resigned this position, however, in March 1900, in order to proceed to the front in the S. African war (1899-1902) as captain in the Imperial Yeo-manry. He has been three times mayor of Sheffield (1895-7).

Norfolk, Hugh Bigod, First Earl of (d. 1177), king's stew-ard. He helped Stephen of Blois to gain the crown of England in 1135, but repeatedly deserted his side. He played the same parts with Henry of Anjou until his final subjection in 1174.

Norfolk, Roger Bigod, Fourth EARL OF (d. 1270), marshal of England; joined the party of reform, and was prominent in framing the Provisions of Oxford (1258). He was summoned to the Parliament of 1265.

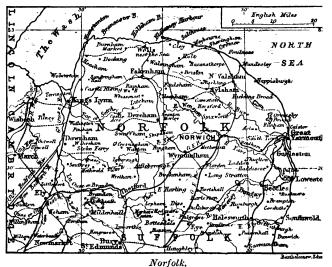
Norfolk, Roger Bigon, fifth Earl of (1245-1306), marshal of England. He and Bohun, Earl of Hereford, were leaders in the constitutional struggle with Edward I. They secured the confirmation of the charters at the Parliament of Lincoln (1301).

Norfolk Island, in Pacific, 29° s. and 168° E., some 1,200 m. 20 sq. in. The highest point is Mount Pitt (1,050 ft.). The soil is very fertile, and fruit is abundant. Whaling, agriculture, and herding are the occupations. The Norfolk Island pine (Araucaria excelsa) is the characteristic tree; the birds also are peculiar. Dis-

Normal, PERPENDICULAR TO. in geometry, a perpendicular to the tangent at the point of contact. Normal Schools. See EDUCA-

Norman, SIR HENRY WYLIE (1826 1904), English field-mar-shal, born in London. After serv-ing in the Sikh war of 1848-9, on the Peshawar frontier, and in the Santhal revolt, he was present at the siege of Delhi and the re-lief of Lucknow. He was successively governor of Jamaica and of Queensland, chairman of a royal commission on the West Indian colonies, and a member of the royal commission on the South African war.

Norman, HENRY (1858), English author and traveller, was In 1886 he born at Leicester.



covered in 1774 by Captain Cook, the island was used as a penal station by New South Wales and Tasmania till 1855. In 1856 the mutineers of the *Bounty* were transferred to Norfolk Island from Pitcairn Island; and in 1865 it became the headquarters of the Melanesian Mission founded by Bishop Pattison. Pop. 870.

Noricum, prov. of Roman empire, bounded by the Danube on N., corresponding to modern Styria, Carinthia, Salzburg, and part of Austria. Its inhabitants were of Celtic race; they were con-

quered by the Romans in 14 A.D. Norma, the Rule or Square, a southern constellation adjacent to Circinus, formed by Lacaille in 1752. The outburst of Nova Normæ was recorded on a photograph taken by Bailey, July 10, 1893, and came to be known through Mrs. Fleming's examination of the plate.

became a member of the staff of the Pall Mall Gazette, passing in 1892 to the literary editorship of the Daily Chronicle. For the same journal he travelled in the Near East in 1895; and after doing valuable work in connection with the Venezuelan boundary dispute in 1896, he won further distinction as the correspondent of the Chronicle in the Greco-Turkish war. In 1899 he left the Chronicle, and since 1900 has represented S. Wolverhampton in Parliament in the Liberal interest. In 1902 he founded the World's Work, an illustrated monthly magazine, which he continues to edit. The fruits of his travels have appeared in The Real Japan (1892), The Peoples and Politics of the Far East (1895), All the Russias (1902), and Motors and Men (1905).

Norman Architecture.

Architecture.

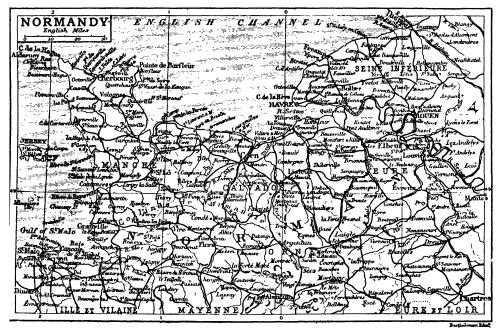
Normanby, tn., North Riding, Yorkshire, England, 4 m. s.e. of Middlesbrough. Manufactures glass and bricks. Pop. (1901) 9,645.

Norman Conquest, by William of Normandy, was begun in 1066 by the victory of Senlac or Hastings, and completed in 1071, when William took Ely and Hereward the Wake made peace. After the conquest the English Church was reformed and reorganized. The connection between England and other European lands was strengthened, foreign trade expanded, and a great advance was made in literature, architecture, learning, and arts. Improvements took place in building and the art of war, and changes were effected in

and Chicago. Her subjects are mainly classical, but she executed a fresco of Sir Richard Whittington and his Charities for the Royal Exchange (1900).

Normandy, former prov. of France, bordering on the English Channel, and now divided into the departments of Scine Inférieure, Eure, Orne, Calvados, and La Manche. It was divided into Upper Normandy (N.E. part), containing Rouen (the former and present capital), and Lower Normandy (S. and W. parts). The Cymri seem to have been the carliest inhabitants of Normandy in historic times, and they offered a fierce resistance to the Romans under Julius Cæsar. With the arrival of the Franks, Normandy

mained closely connected with England, but the French king, Philip Augustus, was able to conquer Normandy in the reign of John. At the treaty of Paris in 1258 Henry 111. of England acquiesced in the loss of Normandy. In the reign of Henry V., Normandy was again conquered by the English; but after his death it was reconquered by the French. Normandy is famous for its cathedrals, its castles and abbeys, and the memorials of its early history. See Freeman's History of the Normand Conquest (1877), Palgrave's History of Normandy and of England (1878), Mitton and Jungman's Normandy (1905), and Home's Normandy (1905),



the language of the land. While new laws were at times introduced, and the administrative machinery improved, the old laws and institutions were preserved. The influence of the Norman conquest was rather provocative and invigorative than destructive. See Freeman's History of the Norman Conquest (1877), Stubbs's Constitutional Historical Introductions to the Rolls Series.

Normand, Mrs. Ernest, née HENRIETTA RAE (1859), English painter, born in London; has exhibited annually at the Royal Academy since 1880. She won medals at the exhibitions of Paris mandy became a portion of Neutria, and, under the later Carolings, suffered much from the invasions of the northmen. In 911 the treaty of St. Clair-sur-Epte, between Charles the Simple and Rollo the Northman, proved the foundation of the duchy of Normandy. Richard the Good (996-1026) was recognized as a French prince, and in the earlier half of the 11th century the church in Normandy made great progress. William (1035), with the aid of the king of France, put down all opposition in his duchy, and then with the aid of his Norman subjects overcame the king of France. After the Norman conquest Normandy re-

Norman French was introduced into England at the time of the conquest, and was identical with the French of that day. was used by lawyers, but in course of time passed out of common use. A statute of 1362 enacted that pleadings should be in English, but enrolled in Latin. The language of the statute-book was sometimes Latin and sometimes French from 1266 till 1349, French till 1483. The earliest important law treatise in Nor-man French is *Britton*, in 1291; and the latest, Littleton, in 1481. All the year books are in Norman French, which was used till the middle of the 16th century in law reports.

Normann-Neruda. See HALLÉ, LADY.

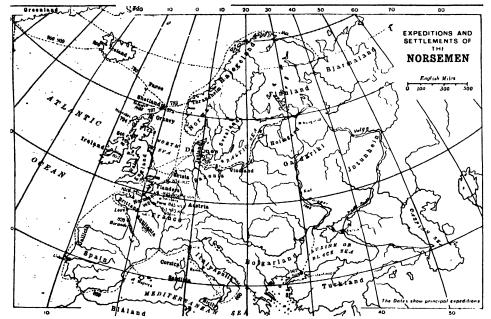
Normanton, tn., W. Riding, Yorkshire, England, 4 m. N.E. of Wakefield. Chemicals are manufactured, and there are collieries and stone quarries. Pop. (1901) 12,352.

Norns. See MYTHOLOGY--Northern.

Norris, Frank (1870 1902), American novelist, born in Chicago. An art student in Paris (1887 9), in 1896 he went to S. Africa as war correspondent for the San Francisco Chronicle, in 1898 to Cuba in a similar capacity for M'Clurc's. In 1896 7 he edited the San Francisco Ware. the Var, and the siege of Toulon. In 1718 he was a lord of the Admiralty. In 1739 he was appointed vice-admiral of England and commander-in-chief of the flort.

Norris, William Edward (1847), English novelist, forsook law for literature. Heaps of Moncy (1877) was the first of a series of novels, which includes Mademoiselle de Mersae (1880), Matrimony (1881), Adrian Vidal (1885), Clarissa Furiosa (1897), Mariect.'s Marriage (1897), The Widower (1898), The Flower of the Flock (1900), The Embarrassing Orphan (1901), The Cradit of the Country (1902), Nature's

century. They were also known as Vikings, 'creek dwellers,' from rik, a creek, cove, or fiord (the word has nothing to do with king). They were driven to seek a career abroad by divers inhospitable causes at home. Scandinavfa was over-populated; the land system left nothing for the younger sons to do; while the process by which the stronger chiefs aggrandized themselves at the expense of the smaller drove the minor chiefs to seek their independence on the high seas. The history of their exploits may be divided into two periods one of plundering expeditions, which lasted till the middle of the 9th century.



His chief works are Blix (1900), A Man's Woman (1900), M'Teague (1899), The Octopus (1901), The Pit (1903), and Shanghaied (1904). See Howells in N. Amer. Rev., vol. elxv. pp. 769-778.

Norris, John (1637-1711), English philosophic writer and poet, held a fellowship at All Souls', Oxford, and spent the last twenty years of his life as rector of Bemerton, near Salisbury. His works represent the teaching of Plato and Malebranche. In his Essay towards the Theory of an Ideal and Intelligible World (1701-4) he combated Locke's theories. He also published Reason and Religion and The Natural Immortality of the Soul.

Norris, SIR JOHN (? 1660-1749), British admiral, took part in the battle off Malaga, the forcing of Comedian (1904), Lone Marie (1905), and Barham of Beltana (1905).

Norristown, bor., Pennsylvania, U.S.A., co. seat of Montgomery co., on Schuylkill R., 17 m. N.N.W. of Philadelphia. It produces glass, wire, screws, iron, and hosiery. Pop. (1900) 22,265.

Norrköping, tn., Sweden, co. Ostergötland, on riv. Motala. It manufactures timber, iron, and paper. Iron shipbuilding is carried on. Pop. (1900) 41,008.

Norrland, div. of Sweden, comprising the counties of Gefleborg, Westernorrland, Jemtland, Westerbotten, and Norrbotten.

Norsemen, generally the inhabitants of Scandinavia, more particularly those of Norway, who ravaged the coasts of N.W. Europe from the 8th to the 11th

and the other as conquering invaders setting up kingdoms. About the end of the 8th century they began to make descents on the English coast, where they were known as Danes; and at the same time they ravaged the shores of Flanders and France. Gradually they worked their way southwards, and soon there was a Norse camp at the mouth of nearly every navigable river in France. These rivers they ascended in their light craft. Three times did they capture Paris (845, 857, 861), though on a fourth they were repulsed. From England they were driven away by the genius of Alfred; in France, however, a weak king tried to buy favour by making over to Rollo the duchy of Normandy as a feudal fief (912), on condi-

tion that Rollo embraced Christianity; and it was from this settlement that the Normans came to conquer England (1066). As early as 860 the Norsemen entered the Mediterranean, and eventually they founded king-doms in Lower Italy and in Sicily. The Pope created Robert Guiscard Duke of Apulia (1059), and Roger II, king of Sicily (1135). The Eastern empire almost fell before them; but this attack came from Russia, where Norsemen had founded a kingdom and a dynasty, that of Rurik (862-1598). But when Russia became Christian under Vladimir (988), the Norsemen, as the Varangar guard, became a bulwark of the declining Byzantine empire. At least as early as the 7th century the Norsemen began to visit the western isles of Scotland and to make settlements in Ireland, their intercourse with the latter being especially close and fruitful for their culture. They conquered the north of Ireland (849), and a Norse king-dom of Dublin, which lasted three centuries, was founded in 852. The Faroe, Shetland, and Orkney Islands they early used as convenient stopping-places; and from these it was but a short step to Iceland (discovered 860), to Greenland (876), and to Vinland, which was probably Nova Scotia (997). The history of the Danish invasions of England, and of the kingdom established by ('aon the Ringian established by Arnute, is treated under England AND WALES. See Alex. Bugge's Vikingerne (1904); Du Chaillu's The Viking Age (1890); Keary's Vikings in Western Christendom (1891); and for the controversy regarding the situation of Vinland, see Justin Winsor's Narrative and Critical History of America, vol. i. (1885).

North, Christopher. See Wilson, John.

North, FREDERICK, SECOND EARL OF GUILFORD (1732-92), British statesman, generally known as Lord North. Entering Parliament (1754) as member for Banbury, he became Chancellor of the Exchequer in 1767, and premier in 1770. Though he probably hastened the war of American independence through his continuance of the obnoxious tea duty and by other measures, he strove to bring it to an early close. Only the king's persuasion deferred his resignation until His subservience to the king is the one blot on his character. His last office was that of Secretary of State in the Fox and North coalition ministry of 1783. See The Correspondence of George III. with Lord North, ed. by W. Bodham Donne (2 vols. 1867). North, Roger (1653-1734), Eng-

lish lawyer and biographer, was

the youngest son of Dudley, fourth Lord North, and was born at Tolstock, Suffolk. He had a large and profitable practice as a barrister. In 1685 he sat in Parliament for Dunwich, being in opposition to the court. At the accession of William III. he went into retirement as a nonjuror, and bought an estate at Rougham, Norfolk. His chief works were Apology for Charles 11. (1740), Lives of the Norths (1742-4; 1890, ed. A. Jessopp), and Autobiography, ed. A. Jessopp (2nd ed. 1890). North, SIR THOMAS (c. 1535-c. 1601), English translator, was the youngest son of Edward, first Lord North. He served as a cap-tain against the Armada, but he chiefly occupied himself in literary pursuits, living near Cambridge. His Diall of Princes (1557), a version of Guevara's Libro Aureo, is important in the history of cuphuism; and his Plutarch's Lives (1579; new ed. 1895) is probably the high-water mark of Elizabethan translation. He also wrote Morall Philosophy of Doni (1570; ed. J. Jacobs, 1891). See Shakespeare's Pluturch (a selection), ed. W. W. Skeat (1895).

North Adams, city, Berkshire ,, Massachusetts, U.S.A., on co., Massachusetts, U.S.A., on the Hoosac R., 145 m. by rail w.N.W. of Boston. It manufac-tures cotton, woollen, and print goods, boots and shoes, and machinery. Pop. (1900) 24,200.

Northallerton, mrkt. tn., N. Riding, Yorkshire, England, 30 m. N.w. of York. The church of All Saints dates from the 12th and 13th centuries. Saddlery and leather goods, tent and waggon covers, and linoleum are manufactured. The site of the battle of the Standard (1138) lies 3 m. to the N. on Cowton Moor. Pop. (1901) 4,009.

North America, if we include Greenland, lies between 20° and 170° w., but the mainland does not extend E. of 55° w. It gradually tapers from N. to s. The mainland reaches 71° N., and is fringed by innumerable islands to within 5° or 6° of the North Pole. In the s. the conventional boundary is at the narrow isthmus of Panama, 9° from the equator. The bulk of N. America lies in temperate latitudes. The length along the meridian of 80° w. is about 4,300 m., and the breadth on 50° N. is 3,200 m. The total area of the mainland is 7,700,000 sq. m., and if the islands physically belonging to it are added, including Greenland, the area is 9,300,000 sq. m. The average elevation of N. America is 2,300 ft.—more than twice that of Europe. This is due to the vast extent of lofty mountain plateaus in the w.

N. America may be divided into six great natural areas. (1.) The

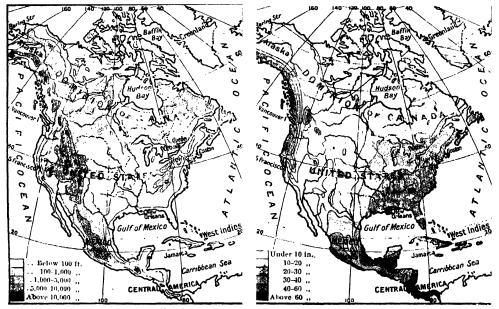
Hudson Archiean Shield and the Great Lakes. In the N.E. is a vast undulating region, of which the shallow Hudson Bay is the core. It is composed of Archæan rocks, and is homologous with the Baltic shield of Europe. Here ice has smoothed the visible rocks and left morainic deposits, especially round the margin. render the drainage irregular, and cause innumerable lakes. Reindeer Lake is an example of the indefinite drainage, for its surplus waters flow both by the Mackenzic to the Arctic and by the Churchill to Hudson Bay. The region is bounded by an crosion escarpment, whose horizontal Palæozoic rocks lie uncon-formably over it in the w. and s.w.; and as in Europe, this glint line' can be traced through many great lakes, which are partially at least of glacial origin-Great Bear, Great Slave, Athabasca, Winnipeg, and the St. Lawrence lakes and estuary.

(2.) The Eastern Highlands, like those of N.W. Europe, to which they are in great part homologous, may be divided into two regions. (a) The North-eastern Highlands run as a narrow band of gneiss mountains from the Strait of Belle Isle to Lancaster Sound, and probably are continued in Grinnell and Grant Lands. In Labrador and Baffin Land they rise from 5,000 to 6,000 ft. steeply from the sea, and are deeply indented with fiords. (b) The Appalachian or South-eastern Highlands can be traced from Newfoundland almost to the Gulf of Mexico; but a western continuation is probably seen in the Ouachita or Washita Mts. w. of the Mississippi. They are composed of an older crystalline band, which predominates in Newfoundland and New England, and a newer belt to the west. The main feature lines run from S.W. to N.E., and S. of the Hudson the Central Appalachian valley, or rather series of valleys, is well marked. North of the James R. the ridges and the older Archaan belt are pierced by rivers flowing into deep inlets, formed by the drowning of the coastal belt. South of James R. the crystalline band is not reached, but the rivers Kanawha and Tennessee both flow by transverse gorges to to the w. The region has passed through more than one erosion cycle. West of the folded Ap-Dalachians the rocks are horizontal, the eastern escarpments being known as the Cumberland, Alleghany, and Catskill mountains. The maximum folding took place towards the close of the Carboniferous epoch, but the region has also been disturbed by post-Triassic fractures. Its present features are mainly due to denudation.

(3.) The Great Plains are composed of horizontal rocks, Palacozoic in the E., where they form the 'glint' line round the Hudson shield, Mesozoic farther W., and here and there covered with nonmarine deposits of Tertiary age. From the Mississippi valley line, which represents their lowest level, they rise gradually west-wards from 5,000 to 6,000 ft. at the base of the Rocky Mts. In the s. they are terminated by a low coastal plain round the Gulf of Mexico, bordered by many lagoons, beyond which the delta of the Mississippi projects like a bird's foot. The Atlantic coast is bordered by a similar plain, and in the s.E. is the Florida penin-

diverse coloured rocks, its sinter terraces, and great geysers, the chain widens, and in Colorado is 60 m. broad. Here the ranges enclose great interment basins or parks,' from which the valleys rise from 7,000 to 11,000 ft., and the peaks to 14,000 ft. South of the park region the chain is lower and narrower, but it rises again in the Sierra Madre of Mexico, and passes into the line of great volcanoes, which forms the southern limit of the Cordillera, and rises above the Tehuantepec isthmus. The Yukon plateau is a region of many rounded, bleak hills, covered with snow for much of the year. The Fraser and Columbia plateaus are more mountainous,

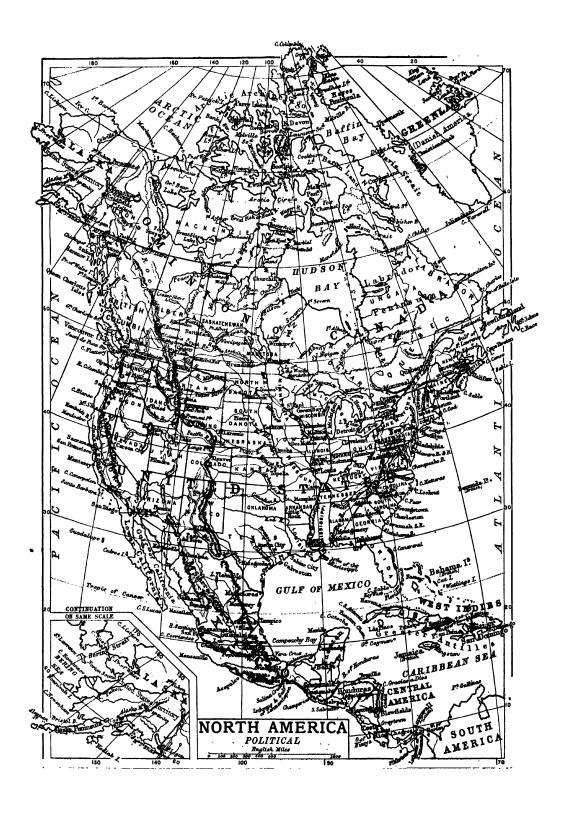
and hinder communication. The W. Sierra Madre are a continuation of the Wasatch Mts. The western chains consist of two parallel ones—the Plateau and Pacific chains. Of the Plateau chain, the St. Elias alps form the loftiest region—Mt. Tralega (or Allen or M'Kinley) reaching nearly 20,500 ft. Great glaciers creep down the valleys to the sea, and the coast is indented with many flords. The N. Cascades are only from 7,000 to 8,000 ft. high, but have much snow in their corries and valleys. The S. Cascades, s. of the Fraser R., are probably a continuation of the N. Cascades, covered with recent volcanic deposits,



North America Contours and Rainfall.

sula, composed of coraliferous linestone recently elevated above

(4.) The Western Cordillera Area consists of a series of mountainous plateaus, which may be named after the rivers draining them-Yukon, Fraser, Columbia, the Great Basin of inland drainage, Colorado, and also that of Mexico-bordered on E. and W. by two long mountain chains. The eastern chain, known as the Rocky Mts., extends from the w. of the Mackenzie delta to the isthmus of Tehuantepec. In the northern or Canadian ranges Palaozoic rocks predominate; the sconery is rugged and alpine. owing to the comparatively low snow-line. South of the Yellowstone valley, with its cañons of and are crossed from N. to S. by lofty ranges, of which the Gold Ranges are the highest and most picturesque; and round them the rivers zigzag in alternate longitudinal and transverse valleys. This plateau terminates in the great lava-fields of Idaho, across which the Snake and other tributaries of the Columbia have cut deep gorges. The Great Basin deep gorges. The Great Basin is formed of tilted block mountains; and in the E. the Wasatch range separates it from the Colorado plateaus, where horizontal rocks predominate, in which the rivers have croded deep terraced valleys or canons. The Mexican plateau rises steadily from N. to s., where it is termed the plateau of Anahuac. Here also cañons and mesas dominate the scenery like the plateau immediately to the w. Great extinct volcanoes rise to 15,000 ft., and the range ends in the symmetrical cone of Mt. Shasta. The Sierra Nevada succeeds, of which some granite domes rise to over 14,000 ft.). The fractured slepe to the E. is steep; that to the W. is more gentle, and is scarred by beautiful valleys, over whose precipitous sides the rivers fall in bands of spray, such as that of the Yosemite. This range may be continued in the California pennsula. This plateau chain sinks to a deep valley in the W., represented by the Heeste, Queen Charlotte, and Puget Sounds, the Willamette and Sacramento valleys, which are bordered to the





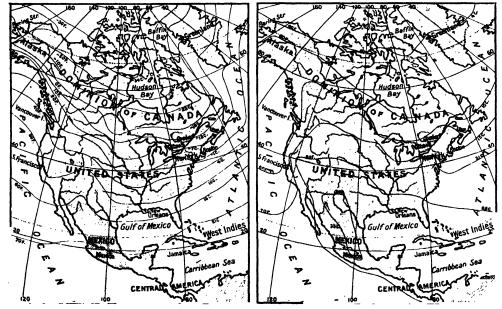
w. by the Pacific coastal chain. In the N. the coastal chain is broken into a succession of islands from Chichagoff to Vancouver, but s. of the Strait of Juan de Fuca it forms the coast range of the United States.

(5.) Central America is not, as popularly, supposed, a continuation of the W. Cordillera system. In the w. is a range of young volcanic mountains, many of them active; in the E. are young folded mountains, which, however, strike w. to E., and not N. to S., and form the Yucatan and Honduras peninsulas. They can be traced castwards in the W. Indies.

(6.) The West Indies consist of four large islands—the Great

gradients are the steepest. In January the temperature in Klondike is -23° F.; s. of it, and in Newfoundland, 20° F.; while in S. California and s. of the Appalachian highland it is over 50° F. The hottest region in summer is the s.w.; the w. coast is remarkable for its uniform temperature, which is little above 60° F. on the s. coast of California, and little below it on the s.E. coast of Alaska, which has the temperature of the s. of Newfoundland. It is over 80° F. round the Gulf of Mexico. The range of temperature is greatest in the N., between the mouth of the Mackenzie and the s. of Hudson Bay (over 60° F.). It is small

ern than the western chain. The great rivers of the intermont plateaus reach the Pacific—the Yukon, the Fraser and Columbia, the Colorado. The longest rivers rise in the Rocky Mountain chain, w. of the main crests, and flow across the Great Plains - the Peace-Mackenzie to the Arctic, the Saskatchewan-Nelson to Hudson Bay, and the Missouri-Mississippi to the Gulf of Mexico. Of the eastern rivers the St. Lawrence, draining five of the largest lakes, is the most important; while the drowned valley of the Hudson forms a waterway across the Appalachian highlands. The short eastern rivers of the Appalachians are navigable for only



North America-January and July Isotherms.

Antilles, whose axes lie W. to E., and a chain of smaller ones, the Lesser Antilles, which extend N. to S., the whole enclosing the Caribbean Sea and the Gulf of Mexico. They are a partially drowned mountain chain of recent foldings. By Suess this Antillean mountain system is regarded as a continuation of that of Venezuela, with a limestone foreland in the Bahamas, Florida, and Yueatan.

Climate.—The continent is sufficiently large to permit great extremes in the interior, and it is but slightly ameliorated by Hudson Bay and the Great Lakes, and more by the hotter Gulf of Mexico. The winter isotherms are concave to the S., those of summer to the N. The winter

on the w. coast and round the Gulf of Mexico, between 20° and 30°, and lower in Central America and the W. Indies, where the mean annual temperature is between 75° and 80° F., and the range between 5° and 10° F. The pressure over the continent is highest in winter, when cold, dry winds blow outwards; and lowest in summer, when moist winds blow from sea to land. Most rain, therefore, falls in summer; but on the W. coast N. of 32° N. in the Gulf of Mexico, and along the E. coast, winter storm winds bring most of the rain. South of Vancouver I. little rain falls on the W. coast in summer.

W. coast in summer.

Hydrography.—The western
mountains form the great N. to S.
divide, which lies nearer the east-

short distances. The southern rivers tend to be intermittent owing to the periodic dry seasons. The largest is the Rio Grande del Norte.

Norte.

The largest area of inland drainage is the Great Basin, where Great Salt Lake is the remnant of a Lake Bonneville, which at one time was much more extensive. The Pyramid and Cañon lakes represent a similar lake. Lahontan, farther w.; and the Red River valley and Lake Winnipeg a third—Lake Agassiz. In the case of the rivers flowing northwards the upper courses are thawed in spring carlier than the lower ones, and this causes great floods. The Mississippi summer floods are often very destructive in the plains.

Minerals.—Gold, silver, copper, lead, coal, abound in the western Cordillera. The gold of Mexico, California, Colorado, Kootenay, and Klondike—the silver of Mexico, Colorado, Montana, Nevada, and Kootenay—copper of Arizona—the coal of Kootenay and Vancouver—the anthracite of Banff—may be cited. Gold is also found in the older rocks of the E., especially N. of the Great Lakes and Nova Scotia. Nickel, pure copper, and excellent iron ores are found round the Great Lakes. Coal abounds in the E. of Nova Scotia, in the northern United States E. of the Hudson, and in the Carboniferous rocks of the Appalachians, or the plateaus and plain to the W.

Vegetation.—The N. region, in which the mean annual temperature is under 20' F., is a barren tundra. The forest area consists of pine forests in the N., deciduous forests in the centre, and evergreen forests in the s. The treeless area consists of the steppes of the W. and the mountain area. The north-western coastal regions alone recall the vegetation conditions of Britain, while those of California resemble Spain. The eastern regions may be compared with those of E. Asia. Over most of N. America, except in the s., vegetation is late. The great heat and the summer rains favour rapid growth, and the relatively dry autumn permits grains and fruits to ripen thoroughly. The fruits to ripen thoroughly. New World is not rich in indigenous species of economic importance, but most of the economic plants of the Old World have been successfully introduced. Wheat and barley are grown in the N. and in the E., maize in the centre, cotton, rice, tobacco, and sugar-cane in the Gulf and Atlantic coastal plains. In California all subtropical products can be successfully raised. Temperate fruits do well in the re-

gions round the great lakes.
Fauna.—N. America may be divided into four faunal provinces: -(1.) The tundra or Arctic province, with polar bear, reindeer, and other forms similar to those in the Old World Arctic province. (2.) The Canadian or cold province, with cariboo indistinguishable from the reindeer of (1), the moose (= elk of Europe), bison, the so-called buf-falo (now nearly extinct, but rigidly protected), the big-horn sheep, the fox, beaver, and other fur bearing animals. (3.) The western or arid province, lying w. of 100° w., and s. of 50°-55° N., is the richest in species, with the prongbuck, the black-tailed deer, and the prairie dog. The jack rabbit is a pest of the sagebrush regions peculiar to it. Grizzly,

black, and cinnamon bears live in the Rockies. This province contains opossums and armadillos. (4.) The Mississippi, Atlantic, and eastern humid region, with the Virginian opossum and the Virginian deer and the round-

tailed musk-rat. Peoples.—At the time of the discovery the w. mountains and Great Plains were inhabited by Red Indians. In the N.W. these show considerable resemblance to the Mongolian type. This has suggested an original migration from Asia across the Alaskan region. In the s. a high degree of civilization was reached on the Mexican plateau. The bulk of the population of N. America is now identical with that of W. Europe. The early colonists were chiefly Spaniards in the s., French in the lower Mississippi and St. Law-rence valleys, and British on the E. coast. During the 19th century there has been a large influx of Germans and Scandinavians. and of Poles, Italians, and other southern Europeans, who supply the demand for cheap labour. The population of the United States alone has grown from 7,240,000 in 1810 to seventy-six millions at the present time. Indians have gradually retreated before the white men, and their numbers have been reduced. A serious race problem is that of the negroes, first imported from Africa in the 16th century as plantation slaves. They were emancipated in 1863, and now number 8,840,000, or about eleven per cent. of the population. The northern tundra is inhabited by Innuits, or Eskimos. Population is densest on both flanks of the Appalachians, round the great lakes, the St. Lawrence and Mississippi valleys, and on the Mexican plateau. is increasing in density along the

Economic Survey.—The first European settlers turned their attention to mining, fur-hunting, and lumbering. As the clearing of the forests proceeded, more and more land became available for agriculture, and many economic plants and animals were introduced. At the beginning of the 19th century a mining and agricultural civilization existed in Mexico, a plantation civilization in the lower Mis-sissippi valley, and s. of the Atlantic coastal plain an agri-cultural civilization extended from Virginia northwards, while lumbering and fur-trading were then, as now, the chief occupations in the northern forest area. The 19th century saw a great extension of agriculture, now the most important occupation of N. The carlier settlers America. had to cross mountains and clear forests in order to obtain virgin

Pacific coast.

soil. Once the grassy plains were reached development was quicker. Farther W., where the rainfall is too low for agriculture, great cattle ranches have been formed. The plains now raise food-supplies for the industrial regions of the E., and even for the W. of Europe. The discovery of gold in California in the middle of the 19th century led to a great movement of population thither, and to the development of the agricultural riches of the Californian valley. Throughout the Rockies there is a large mining industry, while the discovery of coal and iron in the E. has led to the rise of great industrial centres round the unrivalled natural waterways. But it is on the Atlantic plain that the manufacturing, commercial, and financial activities of modern civilization have attained their highest development.

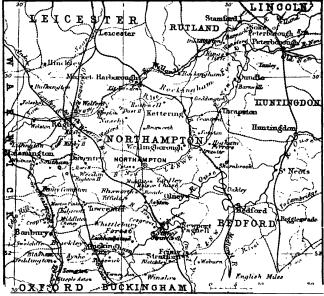
Political Divisions. - At the present time America north of Tehuantepec is divided politically between three powers:-(1.) Great Britain, to whom belong the federal Dominion of Canada. Newfoundland, and the Bermudas. (2.) The federal republic of the United States of America occupies the centre, with Alaska in the N.W. (3.) The federal republic of Mexico lies s. of the United States. (4.) In Central America, however, in addition to British Honduras, there are the independent republics of Guatemala, Nicaragua, Honduras, Salvador, Costa Rica, and Panama. In the W. Indies the British lands are Jamaica, Bahamas, Windward and Leeward Is., and Trinidad; the French, Guade-loupeand Martinique; the United States, Porto Rico; the Danish, St. Croix, St. Thomas, and St. John; and the independent republics of Haiti, San Dominge, and Cuba, the two last having intimate relations with the United States. See Deckert's Nordamerika (1904); Fiske's The Discovery of North America (1892). Suess's The Face of the Earth (1904), vol. i., ch. xi., gives an account of the evolution of the continent; as does De Lapparent's Lecons de does De Lapparents Leçons de Géographie Physique. Israel Russell's works on (1) The Lakes, (2) The Glaciers, (3) The Volcanoes, and (4) The Rivers of North America (1897-8) are readable and useful; and see also his North America (1904).

North American Review, the most authoritative of the critical periodicals published in the United States. It was founded in 1815 by William Tudor, and grewout of a literary review called the Monthly Anthology. Later, the editorship was undertaken by a succession of American men of letters (1862-72), among whom was James Russell Lowell. In

1877 the Review was purchased by Allen Thorndike Rice. In its pages was conducted the religious controversy in which Gladstone, Cardinal Manning, and Colonel Ingersoll participated; the argument between Gladstone and James G. Blaine on Protection and Free Trade; the defence of Home Rule by Gladstone in reply to the Duke of Argyll; and, later, the discussion of the same subject by Mr. Arthur Balfour and Charles Stewart Parnell. Rice's editorship ceased in 1899; the present editor is Colonel G. B. M. Harvey. Originally a bi-monthly, the North American Review now appears monthly.

town was destroyed by fire. Of the castle only fragments remain. The borough returns two members to the House of Commons. Pop. (1901) 87,021; parl. bor., 76,070. (22) City, Massachusetts, U.S.A., co. seat of Hampshire co., on Connecticut R., 45 m. w. of Worcester. It is the seat of Smith's College for girls. It manufactures silk, cutlery, brushes, lumber, hosiery, and wood pulp. Pop. (1900) 18,643.

Northampton, SPENCER JOSHUA ALWYNE COMPTON, SECOND MARQUIS OF (1790-1851), English politician and man of letters, was born at Stoke Park, Wiltshire, and entered Parliament in 1812. He lent his support



Northamptonshire.

Northampton. (1.) Municipal, parl., and co. bor., cap. of Northamptonshire, England, at head of navigation on the Nene, 68 m. N.w. of London. There are four ancient churches—All Saints', rebuilt, except tower, 1675; St. Giles's, with Norman west door; St. Peter's, a fine example of Norman architecture; and St. Sepulchre's, 11th or 12th century, one of the four crusadic churches still remaining in England. The public buildings include also a Roman Catholic cathedral. About two miles from the town is Queen Eleanor's Cross (1294). The staple trade is in boots and shoes, the manufacture of which has flourished here since the middle ages. Brewing and iron-founding are carried on. In 1675 the greater part of the

to Wilberforce and the cause of negro emancipation, and laboured with Sir James Mackintosh for the improvement of the penal code. He took great interest in art and science as well as in literature, and was at various times president of the Royal and Geological Societies and the British Association.

Northampton, William Parr, Marquis of (1513-71), born probably at Kendal Castle. On the marriage of his sister Catherine with Henry VIII. he was created Earl of Essex (1543), and became Marquis of Northampton (1547). During the reign of Mary he was deprived of his titles for the part he played in Lady Jane Grey's succession, but under Elizabeth he regained all his lost honours.

Northamptonshire, midland co., England. The 'soke' of Peterborough, in the N.E., consists of reclaimed fenland. In the w. and s.w. the country is broken and picturesque, with low hill ranges. It is well wooded, with relics of its former forests (Rockingham, Whittlebury, Salcey). The principal rivers are the Nen. Welland, and Ouse, and the Grand Junction Canal affords additional water communication. Ironstone is extensively worked; other minerals are limestone and clay. The fattening of cattle and dairying are leading indus-Northamptonshire is the tries. chief seat of the boot and shoe manufacture in England; other industries are iron-founding, corn-milling, and carving of butter dies. The county returns four members to Parliament. Anciently it formed part of Mercia. In subsequent times it was the scene of the battles of Northampton (1460) and Naseby (1645). Early earthworks and camps are found at Arbury. Borough Hill, and Rainsbury. Watling Street and Ermine Street cross the county, and there are other Roman remains (Irchester, Castor). Many fine examples of mediæval ecclesiastical architecture are found, and Peterborough, Higham Ferrers, and Irthlingborough have traces of their former monastic institutions. Of Fotheringay Castle little remains. Area (anc. co.), 1,003 sq. m.; pop. (1901) 338,064. Area (administrative co.), 909 sq. m.; pop. (1901) 207,467.

North Berwick, royal bur. and seaside and golfing resort, Haddingtonshire, Scotland, 23 m. by rail E.N.E. of Edinburgh, on the S. shore of the Firth of Forth. Behind the town rises North Berwick Law, a characteristic landmark. Three miles east stand the ruins of Tantallon Castle, immortalized by Scott in Marmion; opposite to it, in the firth, is the Bass Rock. To the S.w. are the remains of St. Mary's Benedictine nunnery, founded in 1154. Pon (1901) 2.899

1154. Pop. (1901) 2,899. **North Brabant.** See Bra-BANT, NORTH.

North British Railway, incorporated in 1844 for the working of a railway from Edinburgh to Berwick, has since amalgamated with about fifty companies. The total mileage is 1,150, the main lines running from Edinburgh south to Carlisle; northeast to Dundee, Montrose, and Bervie; west to Glasgow; and north-west to Fort William. The bridges over the Forth and the Tay were initiated by the North British Railway Company. The total capital of the company is £63,903,869; and for the year ending July 1906 the rev-

enue was £4,734,617, and the expenditure £2,473,656. The dividend on ordinary stock for 1905-6 was 11 per cent. The company also owns a fleet of seven steamers.

Northbrook, THOMAS GEORGE BARING, EARL OF (1826-1904). In 1857 he was elected for Penryn and Falmouth, and was made a lord of the Admiralty, a position he held till March 1858. Palmerston returned to power in 1859, and Baring was made Under-Secretary for India. In June 1861 he was transferred to the War Office as under-secretary, but after a while resumed his duties at the India Office, and continued them till 1864. He was undersecretary for the Home Department till 1866, when he succeeded his father as second Baron Northbrook and went to the House of Two years later, when Lords. Mr. Gladstone formed his first administration, he again went to the War Office as under-secretary. On February 1872, on the assassination of the Earl of Mayo, Lord Northbrook was made viceroy of India, but resigned in 1876. The same year an earldom was conferred upon him. He became First Lord of the Admiralty in Mr. (fladstone's second government (1880-5), and in 1884 was sent out to Egypt as lord high commis-sioner to inquire into the finan-cial condition of that country. He separated himself from Mr. Gladstone, however, on the question of Home Rule for Ireland.

North Cachar, dist., Eastern Bengal and Assam, India, in Surma Valley div. of Assam. Area, 1,706 sq. m.; pop. (1901) 40,812.

North Cape, a promontory, Norway, on the island of Magero, generally considered to be the most northerly point in Europe, although Knivskjærodde, to the west, is farther north.

North Carolina, Dakota, etc.

See CAROLINA, DAKOTA, etc.
Northcliffe, BARON (Sir Alfred
Charles William Harmsworth, Bart.), created 1905, newspaper proprietor; born July 15, 1865, Chapelizod, Co. Dublin.

Northcote, SIR HENRY STAFFORD NORTHCOTE, BARON (1846), English administrator, is the second son of the Earl of Iddesleigh. He was attached to the Marquis of Ripon's mission to negotiate the Alabama treaty with the United States (1871), secretary to the British Claim Commission under the treaty of Washington (1871 - 2), private secretary to the Marquis of Salisbury when he proceeded to Constantinople as ambassador (1876-77), and private secretary to his father when Chancellor of the Exchequer (1877-80). He entered Parliament as member for Exeter in 1880, was made financial secretary to the War Office in

1885 6, and surveyor-general of ordnance from July 1886 to the abolition of the office in 1887. He was raised to the peerage as Baron Northcote in 1900, on his appointment as governor of Bombay, and in 1903 he was appointed governor-general of the Australian Commonwealth.

Northcote, James (1746-1831), English painter, was born at Plymouth; studied under Sir Joshua Reynolds and at the Royal Academy schools, subsequently spending three years in Italy. Returning to England, he became popular as a portrait painter, but was perhaps better known by his historical works, which include the Murder and Burial of the Princes in the Tower, and Death of Wat Tyler. He wrote Lives of Reynolds (1813) and Titian (1830).

Northcote, SIR STAFFORD.

See Indesleigh. North-Eastern Railway originated from an amalgama-tion of the York, Newcastle, and Berwick Railway, the York and North Midland Railway, and the Leeds Northern Railway. 1863 the Stockton and Darlington Railway (the oldest in the world) was taken over. The total mileage owned is 1,695, the chief lines extending from Doncaster and York to Hull and Scarborough on the cast. Carlisle on the west. and to Newcastle and Berwick in the north. The total capital of the company is £76,986,571, and in 1905 the revenue was £9,407,930 and the expenditure £5,940,990. The dividend on the ordinary stock for 1905 was 5} per cent. The company owns docks at Hull, Middlesbrough, and Hartlepool, and also the Tyne docks.

Northeim, tn., Prussian prov. of Hanover, 56 m. by rail 8. of Hanover. Pop. (1900) 7,833.

Northern Mythology. Sec

Mythology—Northern.
Northern of France Railway Company was incorporated 1845, the banking house of Rothschild being largely interested in it. The lines run from Paris to the frontier of Belgium vid Valenciennes and Lille, and to Calais, Boulogne, Rouen, and Amiens. The total length is Amiens. 2,353 m. The company receives a guarantee from the state of 51 10 francs dividend until 1914, but does not require any contribution to pay this amount.

Northern Railway of Spain was incorporated in 1858. The lines run from Madrid to Irun on the frontier of France, and from Madrid to Corunna and Gijon, from Venta de Baños to Santander, and from Bilbao to Lerida, Tarragona, and Barcelona, with a branch from there to meet the French frontier at Carnfranc. The total length of its own lines is 2,165 m.

Northern Territory (formerly ALEXANDRA LAND), the N. portion of S. Australia, lying N. of 26° S. and between 129° and 138° E.; area, 523,620 sq. m. Much of it is desert; but towards the coasts sugar - cane, rice, cotton, and fruits are grown. The climate is fruits are grown. The climate is tropical. The rainfall is 60 in.. and the wet season lasts from October to April. Gold, copper, lead, and tin exist. Palmerston is the capital, and near it is Port Darwin. From Palmerston to Pine Creek there is a railway (145 m.), part of the proposed transcontinental line. Pearl-fishing is carried on from Melville I. Northern Territory was added to S. Australia in 1863, and is governed by a resident. about 4,000 (including Chinese).

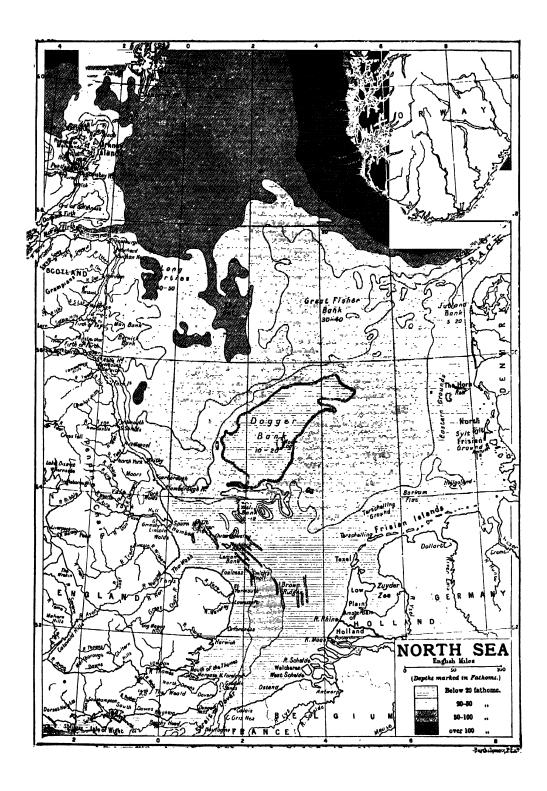
Northers, cold dry winds prevailing from September to March in the regions bordering on the Gulf of Mexico. They are often dangerous to shipping. After the passage of a cyclonic centre the norther may cause a fall of temperature of 30° F. in an hour.

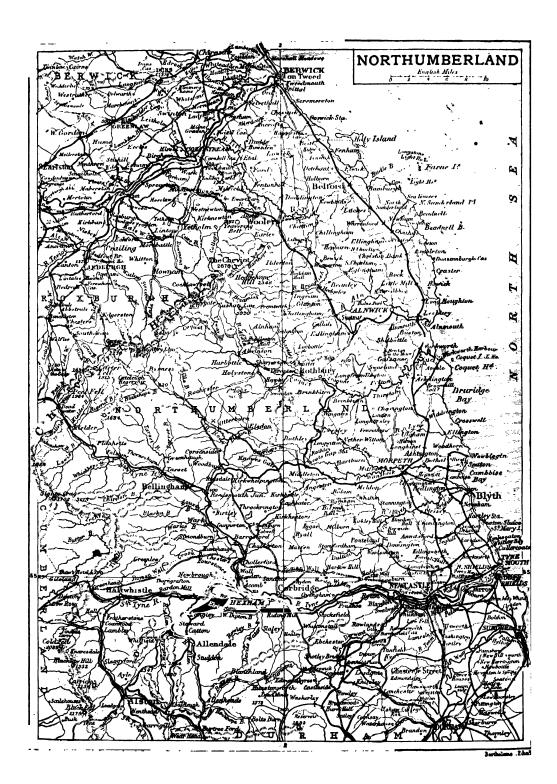
or of 50° in two hours.

Northfield, tn., Franklin co., Massachusetts, U.S.A., 48 m. N.W. of Worces ter, the birthplace of the evangelist D. L. Moody, and the scene of the annual summer conference of Christian workers. Pop. (1900) 1,966.

Northfleet, w. suburb of Gravesend, Kent, England, en the Thames, has shipbuilding yards, chemical, Portland cement, and brick works. Here is a 13th - century church. (1901) 12,913. Pop.

North Foreland, BATTLES OFF THE. (1.) An action fought during the first Dutch war, between a Dutch fleet under M. H. Tromp, De Ruyter, and others, and a British fleet under Monck, Deane, Penn, and Lawson. The battle began on June 2, 1653: that day the Dutch lost two ships, but At night Blake Deane fell. joined the British with eighteen fresh vessels. On the 3rd the British renewed the action, and the Dutch took to flight. They the Dutch took to flight. lost in all eleven ships, and seven or eight sunk or blown up. (2.) One of the bloodiest battles of the second Dutch war. On June 1, 1666, Monck attacked a Dutch fleet under De Ruyter in the Downs. In the first day's fight two British ships were taken, and Sir William Berkeley was killed. On the other side Admiral Cornelis Evertsen, 'the Old,' fell. On June 2nd and 3rd the British continued the engagement, but eventually had to retreat with a loss of twenty-one vessels, besides two flag officers and nine captains. The Dutch lost only six or seven ships; but their victory was by no means decisive.





North German Gazette (Ger. Norddeutsche Allgemeine Zeitung), a semi-official organ of the German government, was founded in 1861 in Berlin. Its original purpose was to champion Austrian as against Prussian influences, and it had also a strongly democratic leaning. Among sits editors have been Liebknecht, the German socialist leader. Then its policy changed, and the paper became a regular supporter of the Prussian government, and was used by Bismarck as his mouthpiece. After Bismarck's retirement it was the organ of Caprivi and his successors in the chancellorship.

North Holland. See Holland, North.

North Island. See New ZEALAND.

Northmen. See Norsemen. North Queensferry. See Queensferry, North.

North Sea, or GERMAN OCEAN, extends from the shores of Belgium, Holland, and Germany N. to the Norwegian Sea at the latitude of the Shetland Isles, a distance of 600 m. Its maximum breadth is 400 m., and its area about 162,000 sq. m. Up to the Moray Firth the bottom is within 60 fathoms of the surface, and the depth nowhere exceeds 100 fathoms, except in the deep channel along the Norwegian coast, where depths exceeding 200 fathoms exist, the maximum being 400. The average over the whole sea is only 61 fathoms. Several banks are scattered over the bed of the sea, the principal being the Dogger Bank, much of it within 10 fathoms of the surface. See DOGGER BANK, Numerous mammal remains -mammoth, woolly rhinoceros, Irish elk-have been dredged up from it. To the N.E. of it lies the great Fisher Bank, with depths of from 30 to 40 fathoms. Water from three sources enters the sea-Baltic water through the Skager Rak. Atlantic water through the Shetland-Färoe Channel, and Arctic water through the Norwegian Sea; and these all differ in salinity and temperature. The water from the N. flows down the coast of Great Britain, and, joined by the tide through the Strait of Dover, sweeps round the southern shore up to the Norwegian depres-sion. The meeting of the tidal wave from the N, and that from the Strait of Dover causes the high tides which help to make London an important port. As a meteorological factor the warm Atlantic water of 35 per thousand salinity, which sometimes continues to flow through the Faroe-Shetland channel till late in November, gives out heat to the atmosphere, and causes barometrical depressions. Fisheries,

which are very productive in the North Sea, seem also to depend on the nature of the water, the cod and herring appearing on the 'bank' Norwegian coast with the water of from 32 to 34 salinity. It is a combination of Baltic water with Arctic water in the N., and Atlantic water and river water in the s., and is rich in animal plankton. A scheme of international exploration is still (1906) being carried out in regard to the fisheries and general conditions. See Report (1902-3) issued for the Fishery Board of Scotland, and government blue-book (September 1906).

North Sea and Baltic Canal. See Kaiser Wilhelm Canal.

North Sydney, residential suburb of Sydney, N.S.W., Australia, on N. shore of Port Jackson. The suspension bridge at the N. end of the suburb is one of the largest in the world. Pop. (1901) 22,050.

Northumberland, maritime co., and the most northerly in England. The coasts are low, in part sandy, in part bordered by cliffs; off the shore are Holy I. or Lindisfarne, the Farne group, Coquet, and St. Mary's. In the east are low cultivated plains, in the centre a hilly region with moorland, rising in the N.W. to the grass-covered Cheviots (Cheviot, 2,676 ft.). The principal rivers are the Tweed with the Till (the former famous for salmon), the Alne, the Coquet (noted for trout), and the Tyne, with the Rede and the Derwent. A special geological feature is the Great Whin Sill, a basaltic dyke traversing the county s.w. and N.E. Coal is worked chiefly in the s., with an output of some twelve million tons; other minerals are lead, zinc, building stone, and fireclay. The area under hay and pasture is nearly two-fifths of the total. Shipbuilding yards are established along the Tyne banks, and engineering, glass, and chemical industries are very important. The county returns four members to Parliament, and in 1882 was formed into a diocese (Newcastle) separate from Durham. The Great Wall, constructed by the Ro-mans between Wallsend and Bowness, and attributed to Hadrian, lies a little N. of the Four Dykes. Under the Saxons the county formed part of Bernicia, and later of Northumbria. (See NORTHUMBRIA.) There are many ancient castles, 'peels,' and mansions, as Alnwick, Chillingham (famous for its wild white cattle), Bamburgh (with ruins of Dunstanburgh), Warkworth, and others. Area (anc. co.), 2,015 sq. m.; pop. (1901) 602,859. Area (admin. co.), 2,009 sq. m.; pop. (1901) 388,059.

Northumberland, Dukes and EARLS OF. The first duke was JOHN DUDLEY (?1502-53), English politician and soldier, who became warden of the Scottish Marches (1542), overthrew the Protector Somerset (1549), and endeavoured to place Lady Jane Grey on the throne. On the accession of Mary he was executed for high treason.—HENRY Percy, first Earl of Northumber-land (d. 1408), dethroned Richard II., and defeated the Scots at Homildon Hill (1402).—His son was HENRY PERCY (killed at Shrewsbury, 1403), surnamed 'Hotspur.' With his father he captured the Earl of Douglas at Homildon Hill, and joined the Welsh prince Glendower against Henry IV. Hotspur is introduced into the first part of Shake-speare's Henry IV. The present duke is descended from Sir Hugh Smithson (d. 1786), first Duke of Northumberland.

Northumbria, a kingdom formed by the union of Deira, which lay between the Tees and the Humber, and Bernicia, between the Tees and the Forth, by Ethelfrith, who reigned from 593 to 617. In 603 he over-threw the king of the Scots at Dawston, near Jedburgh, and in 613 won the battle of Chester, conquering Cheshire and most of Lancashire. After his death, in the battle of the Idle, he was succeeded by Edwin, who belonged to the Deiran house. From his accession to the death of Egfrith, in 685, Northunbria, in spite of sundry reverses, remained the principal kingdom in Britain. Edwin's marriage with Ethelburh, daughter of Ethelbert, king of Kent, led to the introduction of Christianity into Northumbria. Though both Edwin and his successor, Oswald, were overthrown by the united attacks of Penda of Mercia and of Cadwallon of Wales, Oswy established the power of Northumbria on a secure basis. slew Penda in 642 at Maserfield: he strengthened the union of Bernicia and Deira; and in 664, at the Council of Whitby, he decided to accept the Roman form of Christianity. Since Edwin's death Northumbria had been overrun by monks from Iona, who recovered for Christianity much of the country which during Penda's attacks had relapsed into paganism. But the missionary efforts of the Scottish monks produced no permanent organization. On the death of Oswy's successor, Egfrith, in the battle of Nechtansmere (685) the political supremacy of Northumbria died away, and her energies were devoted to the promotion of literary and missionary enterprises.

Bede, who lived from 672 to 735, wrote his Ecclesiastical History and other works, and the monasteries of Lindisfarne, Whitby, and Jarrow became famous for learning. Early in the 9th century the supremacy of Wessex over Northumbria was accepted, but it was not till the reign of William the Conqueror that Northumbria really became a part of England. See Ramsay's The Foundations of England, and Hassall's Class Book of English History.

North-west Frontier Province, a prov. of British India, bounded on the w. by Afghanistan, on the N. by Chitral, and on the S. by Beluchistan. It was formed in 1901, and consists of nearly the whole of Hazara district and the four trans-Indus districts of the Punjab Peshawar, Kohat, Bamu, and Dera Ismail—with some tribal country beyond. Area, 16,500 sq. m. Pop. (1901) 2,125,480. It is under an agent to the Governor-General.

North-west Passage. See ARCTIC EXPLORATION.

North-west Territories, formerly Hudson Bay Territory, Dominion of Canada, are bounded on the N. by the Arctic Ocean, and on the w. by British Columbia and Alaska. This territory (area 2,371,500 sq. m.) was transferred, along with the district now included in Manitoba, by the Hudson's Bay Company, in 1870, to the Dominion of Canada. Four districts were formed out of it-Assiniboia (90,340 sq. m.), Saskatchewan (114,000 sq. m.), Alberta (100,000 sq. m.), and Athabasca (251,390 sq. m.); but in 1905 these four districts were organized as the two provinces of Alberta and Saskatchewan. Beyond these districts there lies an immense unsettled and in part unexplored territory known as Mackenzie (area, 563,000 sq. m.), Ungava in Labrador (area, 354,000 sq. m.), and Franklin in the extreme N. (area unknown); while Keewatin is under the supervision of Manitoba, with an area of 470,000 sq. m. In 1898 the territory of the Yukon was carved out of the Mackenzie territory. This region within its limits 600,000 sq. in. fertile belt in the Saskatchewan basin alone contains about 64,000 8q. m., while beyond are the wheat areas in the valleys of the Peace and Athabasca Rivers. The soil is of exceptional depth and fertility, and the climate is not more severe than that of W. Ontario. The snowfall is light, and as far N. as Dunvegan, on the Peace R. (56° N.), horses are left out the whole winter. About 150 m. E. of the Rocky Mts. the coal bed commences,

and stretches N. to the Arctic Ocean, with a breadth of 300 m. There is an even larger formation of lignite, and in the basin of the Coppernine R. immense deposits of copper. The chief rivers are the Churchill, Albany, and Nelson falling into Hudson Bay, the Mackenzie, Coppermine, and Great Fish Rivers into the Arctic Ocean, and the Saskatchewan, Red R., and Assiniboine falling into Lake Winnipeg. Among the lakes are the Great Bear, Great Slave, and Athabasca. Lake Mistassini, the largest lake, is in Labrador. The Canadian Pacific Railway has done much to open up the southern regions, while its branches to Prince Albert from Regina and to Edmonton from talgary have helped to open up for settlement the fertile valley of the Saskatchewan. The population (1901) of the territories was Alberta, 69,199; Saskatchewan, 89,741; the unorganized territories, 52,709; making in all 211,649. Of recent years a large number of immigrants have come from Russia (Dukhobors) and Finland (Finns), and from the United States. The opening of the Crow's Nest Pass branch of the Canadian Pacific Railway has practically created Lethbridge and M'Leod (s. of Alberta), at the former of which there are coal mines.

Northwich, tn., Cheshire, England, 18 m. E.N.E. of Chester, on the Weaver, which connects with the river Mersey and the Man-chester Ship Canal. The church of St. Helen dates from the 16th century. A free library and museum were presented in 1887 by Sir John Brunner. Boatbuilding, brick-making, and iron-founding are carried on, but by far the most important industries are the manufacture of salt and alkali. The chemical works are the largest in the world. Numerous subsidences have taken place at the surface owing to the pumping of brine for the manufacture of salt and alkali. Pop. (1901) 17,609.

Norton, Andrews (1786-1853), American theologian, became librarian and lecturer of Scriptural criticism at Harvard. A prominent Unitarian, he published Reasons for not believing the Doctrines of Trinitarians (1833), Historical Enidences of the General (1837-44), Translation of the Gospels (1855), Internal Evidences of the Genuineness of the Gospels (1855).

Norton, Mrs. CAROLINE ELIZA-BETH SARAH (1808-77). English poetess, was born in London, a granddaughter of Richard Brinsley Sheridan. Her first book of poems, *The Sorrows of Rosalie* (1829), met with considerable success. It was followed by The Undying One in 1830, and The Dream in 1840. Subsequent to these her two chief works were The Child of the Islands (1845) and The Lady of La Garaye (1862). She published two novels—Stuart of Dunleth (1851) and Lost and Saved (1863). A privately printed pamphlet, English Laws for Women in the Nineteenth Century (1854), was written by her as a vindication and an appeal against her husband's ill-usage of her.

Norton, Charles Bowyer Addition of 1814–1905), was born at Knighton, Leicestershire, and entered Parliament for Staffordshire in 1841, holding the seat in the Conservative interest until 1878. Among his offices were those of undersecretary for the colonics in 1865–68, and President of the Board of Trade (1874-8). In the latter year he was raised to the peerage. He published works on the revival of constitutional colonial policy, on prison discipline (1856), and on socialism (1886).

Norton, Charles Eliot (1827), American author, was born at Cambridge, Massachusetts; is an authority on Dante, and was professor of the history of art at Harvard (1874-98). With James Russell Lowell he edited the North American Review (1861-8), and among his publications are Historical Studies of Church Building in the Middle Ayes (1876), Notes of Travel and Study in Haly (1860), and Considerations of Some Recent Social Theories (1853). He has translated Dante's Vita Naoca and Divina Commedia (1891).

Norton, Fletcher, First Baron Grantley (1716 89), born at Grantley, near Ripon; entered Parliament (1756), and was elected Speaker of the House of Commons (1770). In 1782 he was created a baron.

Norton, Thomas (1532-84), English lawyer and poet, was born in London; entered Parliament (1558), and became remembrancer of the city of London (1571). He supported all the measures against the Roman Catholics, even to the extent of submitting them to torture. As a poet he is best known as joint-author with Sackville of the first tragedy in English and in blank verse, The Tragedic of Gorboduc (1561).

Norwalk. (1.) Summer resort, Fairfield co., Connecticut, U.S.A., on Long I. Sound, 14 m. s.w. of Bridgeport; has oyster fisheries. It manufactures hats, shoes, silk and felt goods, and locks. Pop. (1900) 6,125. (2.) Capital of Huron co., Ohio, U.S.A., 55 m. s.w. of Cleveland; has iron and steel works, and factories for machines. Pop. (1900) 7,074,

Norway (Norw. Norge), a kingdom of Europe, extending from 577 59' to 71' 12' N. lat., a distance of 1,060 m. Its area is 124,130 sq. m. Norway forms the western portion of the Scandinavian peninsula, and is in configuration a vast plateau, the eastern portion of which is intersected by large valleys, while the western

irrigated by the Tana, Alten, and other rivers, possess during the short summer a comparatively temperate climate. West and s. of the North Cape begins the long string of sheltering islands, the Skjærgaard, which is one of the most peculiar physical features of Norway. The Lyngen Fiord is bounded towards the E. by high



Norway -- Southern Portion.

and northern parts are indented by winding fiords. The average altitude of the land is 1,600 ft. above sea-level; hence the arable portion constitutes little more than from one to three per cent. of the whole superficial area. Finmark, the northernmost province, consists mostly of low rounded hillooks, bare and rugged towards the sea; while the inland valleys, mountainous country and glaciers from 4,600 to more than 6,000 ft. in height; farther S. is the glacier-capped Sulitjelma (5,640 ft.). Here, too, are the Vesteraelen islands, from which the Lofotens stretch far out into the sea. Around Trondhjem Fiord lies a fruitful and well-cultivated district. At about 63° the highlands split into

two parts; the south-western portion, following the coast, is known as the Dovrefield (highest point Snehätta, 7,550 ft.). mountainous plateau fringing the western coast is broken up by a series of great fiords, which penetrate as tar as 125 m. into the land, the chief of them being Sundal, Römsdal, and Söndmöre. The loftiest and wildest mountainous country of Norway lies, however, to the N. of the far-winding Sogne Fiord, and is known as Jotunfjelde, or the Giant Mts. (6,550 ft.). The snow-line here begins at 4,550 ft. Galdhöppigen and Glittretind, both in Gudbrandsdal, are the highest peaks of Norway (8,320 and 8,290 ft. respectively). In the western por-tion of the Jotunfjelde rises the wild group of the Horunger (from 6,500 to 7,640 ft.). Here, too, is the Jostedalsbræ, a glacier 56 m. long and 50 m. broad, and reaching an altitude of 7,000 ft. South of the Sogne Fiord lies a broad tableland, the central portion of which consists of the fruitful Voss district, and is bounded on the s. by the Hardanger Fiord. West of the Hardanger Fiord lies the glacier Folgefonn, 37 m. long and from 7½ to 28 m. wide. Beyond the Bömmel Fiord the land becomes much East of Lindesnäs, the lower. most southerly point of Norway, the low, bare tablelands rise into the rugged Thelemark mountains. Adjoining the Thelemark region are five large valleys, which converge upon Christiania Fiord. In the s. of Norway is the longest river, the Glommen, and the largest lake, Mjösen, though of smaller lakes there of Norway shows abundant signs of glaciation. Iron ore is found at Arendal and Dunderlands, gold and lead at Kongsberg, cobalt and nickel at Lillehammer and elsewhere, and copper ore at Thelemark. population numbered in 1815 only 885,431, but the census of 1901 showed 2,240,000.

The Norwegian coast is characterized by mild winters, much cloud, and heavy downpours. In the highlands the climate is continental, with cold raw winters and relatively warm summers. The forests occupy 24 aper cent. of the total area. Timber is Norway's staple export. In 1905, nearly 4 millions sterling worth of timber (including wood pulp and cellulose) was exported. But the forests have been recklessly exploited. The sea fisheries are another important industry. In 1905 the total value of the fish exported was £2,500,000. The cod fishery comes first in importance, and used to employ 70,000 men and 16,000 boats.

Since 1897, however, this fishery has partially failed, especially in the Lofotens, its most important seat. In 1905, only 20,500 fisher-men and 5,800 boats were engaged. Up to 1870 the herring fishery was scarcely less important, and is still considerable, employing 40,000 men and 8,000 boats. Six millions of mackerel are also caught annually. The mining industries of Norway are mostly in a languishing condition. The total exports reached in 1905 a value of £10,273,350, and the imports a value of £16,061,122. The merchant marine in 1905 consisted of 2,174 vessels, representing a tonuage of 1,366,527, being the largest carrying fleet in the world after those of England and the United States. The army is over 30,000 strong, but not more than 18,000 men are kept under arms at one time. Modern fortresses have recently been erected at several important points.

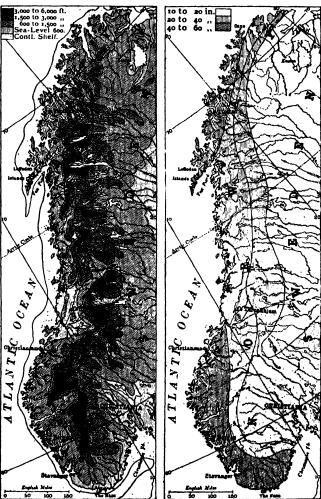
The Evangelical Lutheran is the officially recognized religion. The legislative authority is vested in the people as represented by the Storthing (parliament). The members of the Storthing 76 for the country parts and 38 for the towns—are elected indirectly by voters selected by boards of electors. The Storthing is divided into an upper and a lower chamber, called respectively Lagthing and Odelsthing. Ecclesiastically, Norway is divided into six dio-ceses Christiania, Hamar, Kristiansund, Bergen, Trondhjem, and Tromsö. The standard of education is high. There is a university at Christiania (founded in 1811).

See Norges Land og Folk (1886-99), ed. by Kiær, Vibe, and Hel-land; Dyring's Kongeriget Norge (1904); Giertsen and Halvorsen's Norway Illustrated (1888); Keary's Norway and the Norwegians (1892); Haukenæs's Reiseskildringer fra Norges Natur og Folkliv (5 vols., 1890-93); Schübeler's Viridarium norregicum (1885, etc.); Kjerulf's Die Geologie der südlichen und mittlern Nor-wegen (1880); and Norway, ed. Konow and Fischer (Eng. trans. 1900).

Literature.-Norwegian literature, properly speaking, is not older than the third decade of the 19th century. The skalds and the saga-writers were, no doubt, largely of Norse origin. but they wrote in a language which a modern Norwegian would not understand, and an account of their achievements will be found under ICELAND—Language and Under ICELAND—Zategatege Literature. During the long Danish dominion, Norway can scarcely be said to have had a national literature at all. Peder Dass's versified description of

lands Trompet (before 1708) is the sole noteworthy native pro-duct of the whole period. Most of the learned men wrote in Latin. tives were C. Hansen, C. N. Schwach, and H. A. Bjerregaard,

northern Norway entitled Nordwith classical traditions; whereas the highly-cultured Welhaven had more conservative tendencies, and, himself a master of After 1814 the chief representastyle, insisted upon the necessity of formal excellence in others. the last of whom was the author of the first national drama, Fjelde-



Norway-Contours and Rainfall.

rentyret. The period between 1830 and 1845 is remarkable for the sharp polemic between the followers of the rival poets Henrik Wergeland (1808-45) and J. S. Welhaven (1807-73), which divided literary Norway into two hostile camps. Wergeland was an enthusiastic patriotic radical, who disparaged 'mere style,' and

the famous romance Amtmandens Dötre (1855), the first work which contended for 'the emancipation of the Scandinavian women.' The patriotic spirit of the Norwegians continued to influence the development of the literature throughout the middle of the 19th century. To it we owe the justly admired Norwegian folk-tales

would have broken altogether

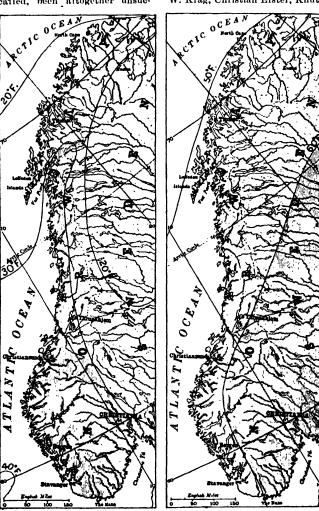
Another eminent writer of this

sister Camilla Collett, author of

generation was

Wergeland's

(Norske Folkeeventyr) collected by Ashjörnsen and Moë, and the strenuous cultivation of the peasant dialect or landsmaal, with the avowed object of elevating it into a purely national language, in contradistinction to Danish. Nor have the Maalstrever, as the dialect writers are generally called, Seen altogether unsueand by far the best writer of peasant tales (Jens Tvedt) whom Norway has yet produced, not to mention Ivar Aasen, the lexicographer of the mual. On the other hand, nearly all the great modern Norwegian writers, such as Ibsen, Björnson, Jonas Lie, Alex. Kjelland, Amalie Skram, Thos. and W. Krag, Christian Elster, Knut



Norway -January and July Isotherms.

cessful. They have not indeed superseded Danish, which is still the "official as well as the chief literary language of Norway; but they have erected an independent language alongside of it which can already boast of a literature of its own, including at least one poet (O. Vinje) and one novelist (Arne Garborg) of real genius,

Hamsun, and Hans Aanrud—the last named one of the very few genuine humorists to be met with in the literature—write in what, despite a large admixture of Norse words and expressions, is practically Danish. Within the last two decades, moreover, Norway has contributed notably to scientific literature. History in

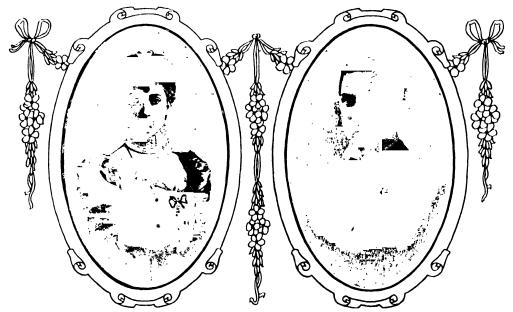
particular has been diligently and successfully cultivated. Among many eminent scholars may be mentioned P. A. Munch and Rudolf Keyser, the founders of the Norwegian historical school; E. Sars, indisputably the greatest of Norwegian historians; Gustav Storm, the antiquarian; N. Nicolaysen; L. Daae; Yngvar Nielsen; J. Lieblein, the Egyptologist; the art critic L. Dietrichsen; the sociologist and statistician E. L. Sundt, who is also an authority on the gypsies; the philosophers Treschow and Monrad; the philologists Unger, Fritzner, and Sophus Bugge. Sec Jaeger's Illustreret Norsk Literaturhistorie (1892, etc.), continued by Naerup in Den Moderne Norske Literatur (1905), J. Bing's Norsk Literaturhistoric (1904). Boyesen's Essays on Scandinavian Literature (1895), Tissot's Le Drame norvégien (1893), Norsk Forfatter-Halvorsen's lexicon (1881, etc.), Horn's Geschichte des scandinavischen Nordens (1880), Jacger's Liter-atur-historiske Pennetegninger (1878), Schweitzer's Geschichte der skandinavischen Literatur (1886-9).

History.—In the Viking expeditions (8th century onwards), the Norwegians took a leading part, helping to conquer and colonize the islands between the Arctic circle and Ireland and planting petty kingdoms in Ire-land itself, where the chief ports are of Norse origin. Harold Haarfager founded the Nor-wegian kingdom by his victory at Hafrsfjord (832) over the local kinglets, but not for centuries could the whole Norwegian realm be made to submit to one common law. Christianity was first introduced by Olaf Tryggyason, who fell at the battle of Svoldr in the year 1000, and his descendant Olaf Haraldsson (throughout the middle ages the tutelary saint of Norway) finally consolidated the new religion on the ruins of the old. The organization of the Norwegian church as an independent establishment took place about 1150, when Norway first got her own archbishop, the primacy having previously belonged to the Danish archbishop of Lund. Throughout the earlier middle ages Norway was the theatre of an almost perpetual struggle between rival pretenders to the throne, which resulted in the weakening of the royal authority and the domination of an aristocratic caste. King Sverre, how-ever (1177-1202), who was raised to the throne by the plebeian Birkebeiner, endeavoured to repress the aristocracy by abolishing the old hereditary feudal

system of investiture and ruling

the land through royal governors. The contest between the crown and the magnates terminated in favour of the crown under Haco the Old (1217-1263), who is also famous as the subjugator of Iceland and Greenland. His son Magnus the Lawgiver (1263-1284), who first codified the Norwegian laws, surrendered the Hebrides and the Isle of Man to Scotland by the peace of Perth. With Haco v. (1239-1319), who finally completed the work begun by Sverre, the Norwegian dynasty of Harold Haarfager became extinct, and the crown of Norway passed to the Swedish king, Magnus Erikson, of the Folkunger dynasty. The union with Sweden

of Norway to Sweden, as a re-ward for the services of the latter to the Grand Alliance, obtained the formal cession of the kingdom from the Danish monarch, Frederick VI., by the peace of Kiel (Jan. 14, 1814). The Norwegians, however, refused to acknowledge a convention which had been concluded behind their backs, and a National Assembly summoned to Eidsvold by the last Danish viceroy, Prince Christian Frederick, after framing a constitution, elected that prince king of Norway. But it was an easy matter for the Swedish crown-prince to drive the Norwegian army across the Glommen and capture the fortress of Frederikshald. He on the part of the smaller state to obtain absolute independence, even at the risk of breaking up the union. Nevertheless the relations between the two states were fairly harmonious under the masterful Charles xiv. (1818 44), who promptly suppressed every antiunional tendency, and also under the complaisant and popular Oscar I. (1844 59), who conceded to the Norwegians a national flag and a national coat of arms; but in the very first year of the reign of Charles xv. (1859 72) the Norwegian Storthing provoked a contest by passing an act abolishing the prerogative of the king to appoint a viceroy for Norway, which act Charles xv. refused

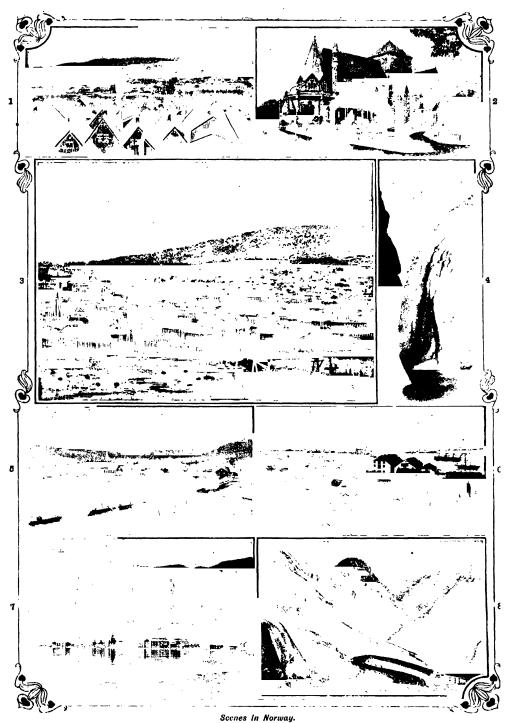


King Haakon VII. and Quren Maud of Norway.

lasted but twenty-four years, for, in 1343, Magnus consented to transfer Norway to his son Hacci (1343-80), the consort of Margaret of Denmark. After his death, Margaret, by the Union of Calmar (1397), succeeded in uniting in her own person the three Scandinavian crowns. The union was mischievous to all three kingdoms, but to none more so than to Norway. which, though technically an independent kingdom, was reduced to the position of a mere Danish province, and has no independent history till the beginning of the 19th century.

The crown-prince of Sweden, Charles John, who had previously secured the consent of the Great Powers to the annexation then opened negotiations with Christian Frederick, the upshot of which was the Convention of Moss (August 1814), whereby the Danish prince resigned the Norwegian crown, and the king of Sweden agreed to recognize the Eidsvold constitution. On Nov. 14, 1814, the Norwegian Storthing, or parliament, unanimously elected the reigning Swedish king, Charles XIII., king of Norway, and finally, in 1815, the Swedish Riksdag and the Norwegian Storthing in conjunction drew up an Act of Union to define the relations between the two kingdoms.

The history of Norway during her union with Sweden resolves itself into a constant endeavour to sanction. Negotiations then commenced between the two countries for a revision of the Act of Union; but nothing came of it. Oscar II. began his reign by abolishing the viceroyalty. In March 1880 the Storthing amended a fundamental statute on its own initiative, by granting unqualified access to the Storthing to the members of the Council of State. The king promptly vetoed what was an infringement of the constitution, and dismissed the Storthing with a grave note of warning. Nevertheless the Radicals under Sverdrup were again returned by a majority of more than two to one, and their first act was to impeach the moderate Sclmer ministry which had ap-

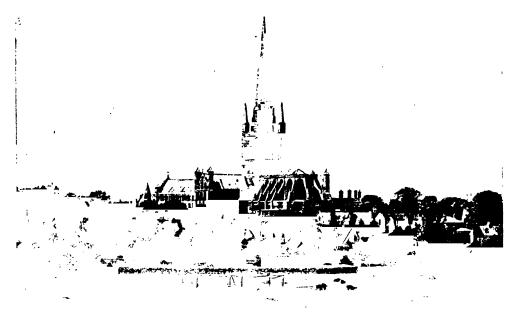


Bergen.
 Trondhjem Cathedral.
 Christiania.
 Tho 'Seven Slaters' Waterfall, Geiranger Flord.
 Lillehammer.
 Hammeriest.
 Odde.
 Naerodal, from Stalhelm. (Photos 1, 2, 3, 5, 6, and 7 by Ellerbeck Bros.; 4 and 8 by Kirkhorn, Molde.)

plied the royal veto during the last session, Selmer himself being dismissed from the Council of State, and fined 20,000 kr. by the supreme Norwegian tribunal. The king refused at first to recognize the jurisdiction of the tribunal, and Selmer's fine was paid by public subscription five times over. When, however, it became clear that the Norwegian people were determined to have their own way, even at the risk of civil war, Oscar II., to save the union, gave way. The decree admitting the councillors of state to the Storthing became law, but an additional clause was therein inserted guaranteeing the exercise of the royal veto in the future. Again, in 1891, the first act of the Steen

reached its climax, and after a plebiscite the union between the two countries was peacefully dissolved by a joint commission of the two Parliaments, which met at Karlstad. Professor Nansen, the Arctic explorer, is understood to have played an influential part in bringing about this result, and in the successful endeavour to secure the election of Prince Charles of Denmark as king of Norway, under the title of Haakon VII. The queen of Norway is the third daughter of King Edward VII. See Sturluson's Heimskringla (Eng. trans., W. Morris and Magnusson, 1891); Munch's Det Norske Folks Historic (1851-63); Keyser and Rygh's Norges Historic (1866-70); Sars's Udsigt over den Norske Historic

Norwich. (1.) City, munic., parl., and co. bor., and co. in itself, in Norfolk, England, on the Wensum, 114 m.N.E. of London. A Norman castle erected soon after the conquest was rebuilt by Stephen; it was subsequently long used as a prison, but in 1887, on the completion of a new jail on Modsehold, was converted into a museum (opened in 1894). The cathedral was founded in 1096. In the 13th century the greater part was burned, and thereafter rebuilt. At the east end are two original Norman chapels. In the 15th century the handsome spire (315 ft.) was crected. The cloisters were finished in 1430, and the vaulted stone roof of the nave in 1472. Within the precincts are the



Norwich Cathedral.

Photo by Frith.

ministry was to demand Norway's separate diplomatic and consular representation abroad, independently of Sweden. The controversy was exacerbated by the tactics of the majority in the Storthing, while extremists like Ullman and Björnson openly invited the intervention of Russia against 'our only enemy'—i.e. Sweden. Civil war again seemed inevitable. Millions of crowns were voted both in Norway and Sweden for national armaments; and it was the king who again saved the situation by granting (Oct. 11, 1897) a separate national trade flag to Norway, besides making minor concessions. In the course of 1905 the crisis

toric (1871-91); Nielsen's Norges Historic efter 1814 (1882-92); Overland's Illustreret Norges Historic (1888-94); Skavlan's Kulturbilleder fra Norges nyere Historic (1892); Norge i det Nittende Aarhundrede; Nansen's Norway and the Union with Sweden (1905).

Nor'-westers, of New Zealand, are dry, warm winds, resembling the fishn of Switzerland, which blow east of the South Island of New Zealand, and are most marked in the province of Canterbury. The nor'wester causes the snow to melt rapidly, and the rivers which rise amidst the glaciers in the upper valleys are soon flooded, rising from ten to twenty feet in a night.

14th-century chapel of St. John (now the grammar school) and the bishop's palace. The largest church, St. Peter Mancroft, is a handsome 15th-century edifice; St. Andrew's was built in 1506. St. Michael-at-Coslany is an example of fine flint and stone work. St. Andrew's Hall, a handsome Gothic structure, was formerly the nave of the Blackfriars monastery church. • The Guildhall (15th century) occupies the site of the Tolbooth. Mousehold, a large open tract to the N., and Chapel Field are public recreation grounds. St. Giles' Hospital, founded about 1250 for aged men and women, now accommodates over

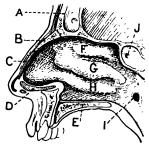
200 inmates. The manufacture of worsted goods has declined; but crape and other fabrics are still produced. Boots and shoes and ready-made clothing are important industries; and there are iron foundries, agricultural implement works, tanneries, breweries, and vinegar works. The manufac-ture of mustard, starch, corn-flour, etc., employs several thousand persons at the Carrow works. It sends two members to Parliament. It has been claimed that Norwich represents the Roman Venta Icenorum; but more probably this was at Caister, 3 m. s. In 1004 the town was burned by the Danes. Edward II. and Edward III. made it a staple for wool, hides, and wool fells. Among subsequent noteworthy events are the Black Death (1348), Littester's rising (1381), and Kett's insurrection (1549). Area (munic. and parl. bor.) 7,582 ac. Pop. (1901) 111,728. (2.) City, Connecticut, U.S.A., co. seat of New London co., on Thames R., at head of particular 40. navigation, 40 m. s.E. of Hartford. It manufactures cotton goods, firearms, and printing presses. Pop. (1900) 17,251. (3.) Capital of Chenango co., New York, U.S.A., on Chenango R., 50 m. s.E. of Syracuse; has railway works, blast-furnaces and foundries, machine shops, carriage factories, tanneries, and creameries. Pop. (1900) 5,766. Norwood. (1.) Suburban dist.,

Norwood. (1.) Suburban dist., Surrey, England, 6 m. s. of London. It is a favourite residential quarter, and comprises Upper, Lower, and S. Norwood, and three ecclesiastical parishes.—Battersea, Croydon, and Lambeth. Pop. 35,387. (2.) Village, Hamilton co., Ohio, U.S.A., a s.w. residential suburb of Cincinnati. Pop. (1900) 6,480. (3.) Suburb, 3 m. E.N.E. of Adelaide, S. Australia, with breweries and market gardens. Pop. 13,000.

Nosári, NAUSARI, or NAVASARI, tn., Baroda state, Bombay, India, 19. s.e. of Surat. It has a large Parsee colony.

Nose, the organ of smell, assists the sense of taste, and is in healthy people the chief channel of respiration. The passages of the nose run upwards and backwards from the nostrils, and open above and behind the soft palate into the top of the pharynx. All the cavities are lined with mucous membrane. The passages of the nose are connected with the ears, behind the drum, by the Eustachian tubes, and with the cyes by the fiasal duets. Hence the inflammatory condition of the nasal mucous membrane, present in a cold, often spreads along the Eustachian tubes and causes tem-

There are many diseases peculiar to the nose. The skin may be affected by lupus; the cartilages and bone may suffer through tubercular disease, syphilis, and other destructive forms of inflammation, causing perforation or destruction. The mucous membrane is particularly liable to inflammations, chronic or acute, and to overgrowth and tumours, nearly always non-malignant. The nerve-endings, or their con-nections with the brain, may undergo temporary or permanent change, involving partial or complete loss of smell. Also children very frequently set up inflammation and suppuration in the nose by thrusting buttons or pencils up the nostrils, where they may remain for years undiscovered. Air which is inspired through the nose is not only to some extent filtered of dust; it is also thoroughly warmed, no matter how cold it may previously have been, before it reaches the larynx. It is also



Section of the Nasal Region, showing the right nasal cavity.

A. Frontal bone; B. nasal bone; c. o. nasal artilages; E. hard palate; F. superior eth-moidal concha; c. interior ethnoidal concha; c. interior turbinal (maxillary concha); t. opening of Eustachian tube; J. opening to sphenoidal sinus.

moistened. In young children the constant effort to draw sufficient air through narrowed passages often produces a permanent deformity of the chest, known commonly as 'pigeon breast.'

Nosology, the branch of medical science devoted to the classification and nomenclature of disease. Scientific arrangements of diseases into groups should be based on pathological distinctions; but until the science of pathology is itself more advanced, provisional classifications framed upon symptomatic affinities are useful.

Nossi Bé, volcanic isl. 6 m. off N.w. coast of Madagascar, is 14 m. long and 9 m. broad; area, 130 sq. m. It has a roadstead at Hellville on 8 side. Pop 10 000

ville, on s. side. Pop. 10,000.

Nostalgia, or Home-Sickness, is a variety of melancholia, which is dealt with medically under that heading. On the mental side, there is depression of feeling due to the unsatisfied desire to return home, sometimes de-

lirium. It affects persons of all ages and both sexes. Usually it supervenes only when the absence is prolonged. It is, in fact, a highly specialized form of the emotional disturbance that follows all considerable alterations of organized habits and habitual environment. The objective change intensities tor the time the subjective feelings, which are the accumulations of years of repeated experience. Nostalgia affects armies in foreign countries, probably causing increased susceptibility to other diseases. It is said to be more marked in mountain and island races than in others; but this is probably because the life of such races is in more intimate touch with nature. In many cases a brief return home acts as a cure; the old environment ceases, in the light of wider experience, to excite the same intensity of feel-Evolutionally, home-sickness may be regarded as the emotional limit of the common phenomenon shown in the catlove of place, or the tendency of the dog and so many other animals to return home (sense of orientation).

Nostoc, a genus of Thallophytes belonging to the division of Schizophytes known as the Cyanophyceæ or Phycochromaccæ. They are bluish or verdigris green in colour, and the cells composing them are arranged in filaments. They form lumps of mucilage, which float in water or lie loose on damp earth. In this mucilage rows of round cells lie coiled up, the symmetry of the rows being occasionally broken by larger cells called heterocysts. They multiply by the escape of the intermediate parts of the chains, known as hormogonimia, which turn on their axes and divide into fresh plants.

Nostradamus (1503-66), the name assumed by Michel de Notredame, French astrologer, of Jewish birth, born at St. Remy (Provence). Practising as a physician at Agen and at Salon, near Aix, he gained a high reputation by his self-sacrificing labours during the plague at Lyons. In 1555 appeared the first edition of his Centuries, or prophecies, which gained him the favour of the French court, besides arousing widespread interest. See Jaubert's Vie de M. Nostradamus (1656), and E. Bareste's Nostradamus (1842).

Nota, Alberto (1775-1847), Italian writer of comedies, was born at Turin, and held various legal posts. He is too fond of imitating others (Molière, Goldoni, Iffland, Kotzebue), and his characters are types rather than individual people. Still, some of his pieces (notably La Lusinghiera) have maintained their poppiera) have maintained their poppiera.

porary deafness.

ularity, by reason of their purity and of the clever development of their plots. The Opere were collected at Florence (1827 et seq.) and Turin (1837 et seq. ; 1842 et seq.).

Notables, assemblies of prominent personages, which it was the custom of the kings of France to call together in circumstances of difficulty. These assemblies had no constitutional powers, and were merely advisory councils. Richelieu preferred them to the States-general on account of the constitutional claims of the latter. Louis XVI., in his last struggles with the revolution, summoned an assembly of notables in 1787, and again in 1788.

Notary Public. The admis-

Notary Public. sion of notaries is governed by the Public Notaries Acts, 1801, 1833, 1843. Notaries are admitted by the master of the faculties of the Archbishop of Canterbury, after an apprenticeship of five years to a notary, or seven years in London. A London notary must be a member of the Scriveners Company, and pass an examina-tion conducted by the Society of Notaries Public. A notarial act is an instrument, attestation, or cer-tificate made by a notary in the execution of his office. A notary may act as a conveyancer and prepare wills; but his most important duties are connected with foreign law, attesting and verifying certificates for use abroad, preparing protests against bills of exchange, and the like. Scotland a law agent is entitled to be a notary, and every notary must be a law agent. In Ireland a notary was formerly admitted by the archbishop of Armagh, but is now by the lord chancellor.

Notelæa, a genus of evergreen Australian shrubs and trees belonging to the order Oleaceæ. They bear axillary racemes of small white flowers, followed by bluish drupes. They are easily grown under glass, in a light peaty soil. Propagation is effected by means of cuttings.

Notes and Queries, a weekly journal founded in 1849 by William John Thoms, its first editor, in co-operation with John Bruce. Its files are a mine of curious information on historical, antiquarian, etymological, and literary subjects. Thoms retired from the editorship in 1872, and was succeeded first by John Doran, who died in 1878, and afterwards by Mr. H. F. Turle and Mr. Joseph Knight, the present editor (1883).

Not Guilty. See VERDICT. Nothochlæna, a genus of tropical and subtropical ferns for stove or greenhouse cultivation. A light, well-drained peaty soil is desirable, and the stem should be kept slightly above the rim of the pot containing the roots.

Nothoscordum, a genus of bulbous plants belonging to the order Liliacea. They bear terminal umbels of flowers, often of much beauty.

Notice. (1.) Equitable. person who purchases an estate with knowledge of a prior con-flicting claim to it is said to have notice of the claim, and will not be allowed to prejudice the claimant in any way. Notice is either (a) actual or (b) constructive. The Conveyancing Act, 1882, enacts that a purchaser shall not be supposed to have constructive notice unless he or his solicitor either knew, or would have known if they had made reasonable inquiries. Generally a purchaser of property, to protect himself, should examine the title-deeds and make the necessarv searches. (2.) JUDICIAL. A judge is supposed to know certain facts, and consequently it is not necessary to prove themsuch as English law, including the statutes, geography, certain official seals and signatures, the weights and measures, the al-manac, and perhaps the English language; but dictionaries may be used to refresh his memory.

Noto, tn., prov. Syracuse, Sicily, Italy, 16 m. s.w. of Syracuse. Destroyed by an earthquake in 1693, it was rebuilt in 1703. (1901) 22,284. Pop.

Notochord. See CHORDATA, Amphioxus, Embryology.

Notornis, a genus of Zew Zea-land birds, probably now extinct, whose members were allied to the rails. In N. mantelli the upper surface was olive green, the head, neck, and under surface dark purplish blue. The bird had short wings and a soft tail, ran swiftly, and was solitary and retiring in its habits. In Norfolk and Lord Howe Is. occurred N. alba, certainly extinct.

Nototherium, a large extinct marsupial, belonging to the group of diprotodonts.

Not Proven. See VERDICT. Notre Dame, French ecclesiological name for the Virgin Mary, Notre Dame de Lourdes' and Notre Dame at Paris.

Note Dame at Paris.

Nottingham, city, co. and parl.
bor., cap. of Nottinghamshire,
England, near the Trent, 115 m.

N.N.W. of London. The churches
of St. Mary, St. Nicholas, and St. Peter are all ancient; St. Mary's is an imposing cruciform structure of the time of Edward III. It is the see of a Roman Catholic bishop. The museum and art gallery are installed in the castle, situated on a steep rock, which, partly demolished by Cromwell, became later the property of the Duke of Newcastle, who erected a mansion, which was burnt by a mob in 1831. In 1878 the site was leased by

the corporation, and the present buildings were erected. The underground dungeon, 'Mortimer's Hole,' recalls the favourite of Isabella, mother of Edward 111. University College buildings form a very handsome group; the central portion is occupied by the college, the eastern by the Central Free Library, and the western by the Natural History Museum. Other public buildings are the Guildhall, Mechanics' Institute, Bromley Institute, Technical School, School of Art, High School, and Exchange. Recreation grounds include the Arboretum, the so-called 'Forest,' containing the former racecourse, and another large open tract called Bulwell Forest.' Near the town are various caves, formerly used as dwelling-places. The new Trent Bridge was opened in 1871. Manufactures of bobbin-net, lace, and hosiery are extensively carried on; others are bicycles, machinery, and leather. Nottingham suffered much from the Danes, and became one of their 'five boroug's.' The borough returns three members to the House of Commons. Pop. (1901) 239,753.

Nottingham, Charles How-ARD, LORD HOWARD OF EFFING-HAM, EARL OF (1536-1624), English admiral and general, was grandson of Thomas, second Duke of Norfolk. In 1574 he was made lord chamberlain. In 1585 he was made lord admiral of England, and had charge of the naval preparations against Spain, and in 1588 of the force which defeated the Armada. In 1586 he served as one of the commissioners for the trial of Mary Queen of Scots. In 1596, in company with Essex, he joined the expedition against Cadiz. In the following year he was created Earl of Nottingham, and in 1599 was made lord lieutenant-general of all England. In 1601 he suppressed the rebellion fomented by Essex; in 1605 was appointed

ambassador to Spain. Nottingham, DANIEL FINCH, SECOND EARL OF (1647-1730), English politician, entered Parliament in 1679, and gradually became the leader of the anti-Jacobite Tories, holding himself, however, aloof from the invita-tion to William of Orange. Appointed Secretary of State under William and Mary, he was subsequently held responsible for failures in the naval warfare of 1692-3, and forced to retire from office. In 1702 he again became Secretary of State under Godolphin, but resigned in 1704.

Nottingham, FINCH HENEAGE, FIRST EARL OF. See FINCH.

Nottinghamshire, midland . co. of England. The surface is varied and undulating; highest

point, 650 ft., in Robin Hood Hills, w. of Worksop. The E., border-ing on Lincolnshire, is low and flat. The county is drained al-most entirely to the Trent, which forms part of the eastern boundary. The Sherwood Forest region, famous as the haunt of Robin Hood, between Mansfield, Worksop, and Retford, is now chiefly enclosed in the group of

The county returns the chief. four members to Parliament. The Roman fossway crosses the s.E. Under the Saxons it formed part of Mercia, and suffered much from the Danish inroads. Remains exist of several ancient ecclesiastical institutions, and at Nottingham and Newark were strong castles. At Southwell is an old cathedral. Area (regis. co.), 843 sq. m.; pop.

NOTTINGHAM-SHIRE English Miles

great parks locally known as the Dukeries.' On the Derbyshire border are the Cresswell caves, which have yielded fossil caves, which have yielded to mammalia, besides human remains. The principal minerals are coal, mined in the s.w. (over 8,918,570 tons in 1904), gypsum, Pich pasture. and limestone. Rich pasture-lands border the Trent. Manufactures are considerable, frameknitting, lace, and hosiery being

(1901) 596,705. Area (administrative co.), 827 sq. m.; pop. (1901) 274,684.

Notus. See Auster.

Notylia, a genus of tropical American orchids, bearing inconspicuous flowers with entire, un-guiculate lips. They grow best in baskets of peat, sphagnum. and potsherds.

Nouméa. See New Calk-DONIA.

Noumenon, the technical term (the correlative of 'phenomenon') used by Kant to designate the things-in-themselves which may exist beyond the world of phenomena known to the human subject. At times Kant speaks as if he assumed without question the existence of the noumenal world of things-in-themselves; but his official and more guarded statement is that we have no right as a matter of theoretical knowledge to affirm their existence. But their existence is an object of moral faith, because the law of duty implies the existence of a moral agency ('I ought, therefore I can') that is above the rigid causal deter-mination of the phenomenal world. See KANT.

Noun. See Parts of Speech. Nouvelle Revue, LA, French journal, was founded in 1879, under the inspiration of Mme. Adam. It was intended as a rival of the Revue des Deux Mondes, and in addition to critical and literary articles, it has always had political writings, its influence in politics being strongly republican. The Nouvelle Rerue is a bi-monthly.

Nouzon, tn., dep. Ardennes, France, 13 m. N.W. of Sedan, on the Meuse, in a very picturesque It smelts iron, and position. makes rails, nails, and agricultural implements. Pop. (1901) 7,795.

Nova, a temporary star attaining suddenly to a brief maximum. The brightest on record flamed out in Cassiopeia on Nov. 6, 1572. Another was observed in Ophiuchus by Kepler and Galileo in October 1604. Anthelm and Hind discovered Novæ in the constellations Vulpecula and Ophiuchus respectively, in 1670 and 1848; and Auwers perceived in Scorpio, May 18, 1860, a seventh-magnitude star which van-ished within a month. Nova ished within a month. Coronæ Borealis, which rose to the second magnitude May 12, 1866, was found by Sir William Huggins to be enveloped in blazing hydrogen. Nova Cygni (third magnitude, Nov. 24, 1876) underwent apparent transformation into a nebula while fading, but now shines, though with excessive faintness, as an ordinary star. Nova Andromedæ (70 magnitude) appeared at the core of the great Andromeda nebula on Aug. 17. 1885, but vanished irrevocably in March 1886. Nova Aurigæ was discovered by Dr. Anderson at Edinburgh on Jan. 31, 1892; the Harvard plates, however, had already stamped its image (Dec. 10, 1891), and recorded its maximum of 4.4 magnitude on December 20. Its photographed spectrum of widened, displaced, and coupled lines excited widespread astonishment. The star became virtually extinct in April, but revived in August 1892 under the guise of a small nebula of ninth stellar magnitude. It had sunk again to eleventh magnitude in January 1905. Nova Persei, discovered by Dr. Anderson on Feb. 22, 1901, outshone twenty-four hours later every star in the northern sky. It was still of twelfth magnitude in July 1903. Six Novæ have been recognized by Mrs. Flenning on the Harvard and Arequipa negatives. They are designated as follows:—Nova Persei, 1887; 9'0 magnitude; bright-line spectrum. Nova Normæ, July 10, 1893; 7'0 magnitude; duplicate bright and dark-

Novaliches, MANUEL PAVIA Y LACY, FIRST MARQUIS DE (1814-96), Spanish soldier; at the close of the Carlist war was made general (1840). Appointed minister of war in 1847, he subsequently took the chief command in the Philippines (1852). On the outbreak of the revolution in 1868 he was appointed commander-inchief for Queen Isabella, but was defeated at the bridge of Alcolea (1868).

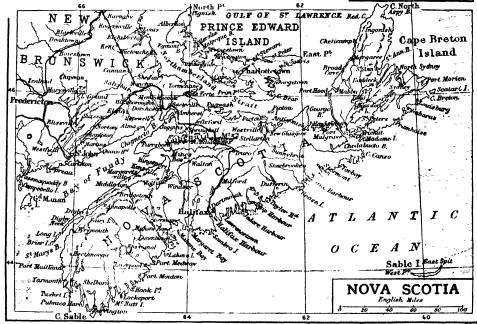
Novalis—pseudonym of GEORG PHILIPP FRIEDRICH VON HARDEN-BERG (1772-1801)—was born at Wiederstedt, near Mansfeld; met at Jena Fichte, the Schlegels, and, above all, Schiller, who became his ideal. He took up Werke came out in 1903. See E. Heilborn's Novalis der Romantiker (1901), Carlyle's Miscellaneous Essays (vol. ii.), and Lives, in German, by Schubart (1887) and Bing (1893).

and Bing (1893).

Novara. (1.) Province, Piedmont, Italy; area, 2,553 sq. m.; pop. (1901)743,115. (2.) Tayn, cap of above, 28 m. w. of Milan, has a 5th-century cathedral, rebuilt

a oth-century cathedral, rebuilt in 11th century. The town was founded by Gauls, and belonged in the middle ages to the duchy of Milan. The Sardinian army was totally defeated here by the Austrians under Radetsky in 1849. Pop. (1901) 44,249.

Nova Scotia, originally Acadia, the most easterly province of the



line spectrum. Nova Carinæ, April 14, 1895; 80 magnitude; duplicate spectrum. Nova Centauri, July 18, 1895; 72 magnitude; innnersed in a nebula. Nova Sagittarii, March 8, 1898; 47 magnitude. Nova Aquilæ, April 21, 1899; 70 magnitude. Nova Geninorum was discovered by Professor Turner on a photograph taken at Oxford on March 16, 1903, when it was of 70 magnitude, but by August it had declined to twelfth magnitude. Stellar apparitions rarely occur outside the Milky Way. Their characteristic spectra of coupled bright and dark lines remain enigmatical. The cause of these luminous outbursts is entirely unknown.

mining as a life calling. works were published by Schlegel and Tieck in 1802, and include a number of religious lyrics, some of which have passed into the hymn books (e.g. Wennallc untreu werden, Wenn ich ihn nur habe), and an unfinished novel, Heinrich von Ofterdingen, the work of a dreamer of beautiful dreams, untouched by whatever is sordid and mean in life. His religion is an even more intense combina-tion of Roman Catholicism and pantheism than was conceived by Angelus Silesius. In claiming him as their prophet, the Romanticists exaggerated his importance and ignored his limitations. His Schriften were edited by Heilborn (1900), and an edition of his Dominion of Canada, consists of a long, narrow peninsula and the island of Cape Breton, separated from the mainland by the narrow Strait of Canso. Greatest length, 350 m.; breadth, 120 m.; area, 21,428 sq. m. The coasts are everywhere indented. Halifax Harbour, Chedabucto, St. Margaret's, St. Mary's, and Mahone bays, Annapolis, Minas, and Chignetto basins, are among its harbours, and the Bras d'Or Lake in Cape Breton is an arm of the sea penetrating to the recesses of the island. Into Minas Basin, penetrating 60 m. inland, the tides of the Bay of Fundy rush with great force, and during the equinoxes rise about 50 ft., while on the opposite shore, at Halifax Har-

bour, the rise does not exceed 8 ft. The climate is compara-tively temperate. The winters, however, are variable, and fog is prevalent along the coast region. All the cereals ripen freely, while apples, pears, and plums grow to perfection. Some attention is perfection. Some attention is being paid to dairy-farming and stock-raising. Manganese and gypsum are extensively worked, and some gold is produced. The output of coal annually is over 5,000,000 tons. Deposits of iron ore are extensive, and the ore is of a very fine quality, but is of a very fine quanty, but is worked only in a few places. In Cape Breton blast-furnaces are at work. The fisheries employ 17,000 men. Lobsters, cod, haddock, mackerel, and herring are the chief fish taken. The principal exports are fish, winesels tumber and agriculting the control of the c minerals, lumber, and agricul-tural products. The population (1901), 459, 106, is mainly of Canadian birth, and chiefly of Scottish and English descent. There are, however, descendants of the Acadians (French), and a German sec-tion in the S.E. There are also 1,546 Indians. The religious denominations in 1901 were: Roman Catholics, 129,578; Presbyterians, 106,319; Baptists, 83,333; Anglicans, 66,067; Methodists, 57,490. Education is free and undenominational, and of a high character. There are six colleges and universities, the oldest being King's College, at Windsor, founded in 1787. The administration is in the hands of a lieutenant-governor, appointed by the Dominion government, assisted by an Executive Council, a Legislative Council of twenty members, and Legislative Assembly of thirty-eight. The province is represented at Ottawa by ten senators and eighteen members of the House of Commons. The land of Evangeline and the island of Cape Breton are the chief centres of attraction for tourists.

Nova Scotia was first visited by the Cabots. In 1621 Sir W. Alexander (afterwards Earl of Stirling) obtained a charter of a country to be called Nova Scotia, which he made several attempts to colonize; but the settlements were a shuttlecock between Britain and France until the treaty of Utrecht (1713) left it finally British. The French settlers (Acadians), however, proved troublesome; and they were deported in 1755—an episode celebrated by Longfellow in Evangeline. Meanwhile Cape Breton remained in the hands of the French; but Louisburg was taken and dismantled in 1758 by General Wolfe. In 1763 the island was annexed to Nova Scotia, but in 1780 it was erected into a separate colony, and was not finally joined to Nova Scotia

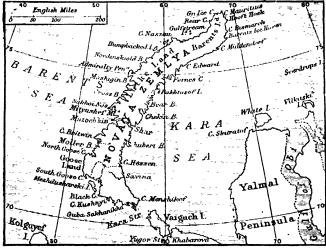
till 1820. The arrival of a large number of loyalists in 1784 led to the separation of the colony of New Brunswick in 1784. Nova Scotia entered the Canadian Confederation in 1867.

See Haliburton's Nova Scotia (1829), Murdoch's History of Nova Scotia (1867), Hannay's Acadia (1879), and Bourinot's Makers of Nova Scotia (1900).

Novation. If a new contract relating to the same subject-matter is substituted for an old one, there is a novation. This is the proper meaning of the word, and it is generally used in this sense in Scotland; but in England, if a new debtor takes the place of the original debtor with the creditor's consent, this is also called a novation, though it is more properly called delegation.

Novatus and Novatians. Novatus was a priest at Rome

Novaya Zemlya, archipelago of Arctic Ocean, composed chiefly of two islands, divided by the Matochkin Shar Strait, belongs to the Archangel government of N. Russia. To the s. it is separated from Vaigach I. by Strait from E.N.E. to W.S.W., 570 m.; greatest breadth, 87 m.; area, 36,000 sq. m. The w. coast is indented with here 25.1. indented with bays and fringed The E. coast is with islands. usually lower, more marshy, and less indented. The interior appears to form a mountainous ridge of the 'fish-backbone' type, continuing the Ural highland system. In Mt. Wilczek it attains The w. coasts are ice-4.000 ft. free in July up to about 75° N. Blizzards are frequent. There are fisheries and hunting-grounds. A Russian and Samoyede colony of a little over a hundred persons



Novaya Zemlya.

in the 3rd century, who attacked Cornelius, bishop of Rome, for improper leniency toward those who had lapsed from the faith during the persecution of Decius. The Novatians denied the power of the church to absolve from certain sins; completely excluded apostates from all hope of reconciliation with God; excommunicated all who indulged in second marriages; and rehaptized new members, as those who had been baptized into a corrupted church. Novatianism was long found at Alexandria, at Constantinople, and in Asia, and the church in Constantine in 331 stig-Africa. matized them as heretics, confiscated their public buildings, and banished their leaders. The sect appears to have died out toward the close of the 5th century.

lives on the south island. In 1504-7 the Dutchman Barents coasted along the west shore and the extreme north-east; in 1742 the east coast was followed for a considerable distance by Russian walrus-hunters; and in 1760 a complete circumnavigation was made round the archivelers.

made round the archipelago.

Novel. The word 'novel' was adopted into our language when the Elizabethan writers began the imitation of Boccaecio and his school. We should not now apply the name novel to any fictitious narrative unless it reached a certain length and contained a more or less complicated plot. As to its subject-matter there are no limits. Novelists have dealt with history, social problems, religion, science, adventure, politics, and economics;

and in the lower branches of the subject we meet with works whose object is even so didactic as the practical teaching of geography. But the legitimate sphere of the novel is perhaps the observation of customs and manners. A distinction is occasionally drawn in England between the novel and the romance, the distinguishing mark of the latter being the presence of the marvellous and adventurous in the story. But romance, as historically known, is the body of tales dealing with Alexander, Charlemagne, or King Arthur, which were written in the vernacular (or romance) languages, as distinguished from what was written in Latin, the scholarly tongue. (See Ro-MANCE.)

In Greece the novel begins with the Cyropardia of Xenophon, a fictitious narrative expounding the author's theory of education. Plato's Atlantis was the father of numerous modern works, such as Bacon's New Atlantis, Sir Thomas More's Utopia, and Campanella's City of the Sun. The Milesian tales, of which no certain examples have reached us except perhaps a few frag-ments embedded in the Latin of Apulcius, would appear to have been witty and licentious, somewhat similar to the Italian novelle. The most noteworthy production of the school of novelists which dates from the Alexan-drian period—the Theagenes and Chariclea of Heliodorus—exercised an enormous influence on novelists after its rediscovery in the later renaissance period. Latin romance-represented principally by the Golden Ass of Apuleius and the Satyricon of Petronius Arbiter—is mainly a translation from the Greek. very interesting branch of early fiction is the use made of the tale by Christian writers in the Byzantine period to spread their faith, as the allegorical Hermas, or the Pastor, and Josaphut and Barlaam of John of Damascus. In fiction, as in most else, the middle ages lost connection with Greek thought, and turned for inspiration to Eastern folk-tales, represented to them by such collections as the Kalilah and Dimnah (an Arabian redaction of earlier Sanskrit originals), the Seven Wisc Masters, and, above all, the Gesta Romanorum. From these collections, either directly or through the medium of the fabliaux writers, Juan Manuel drew the matter for his Spanish Conde Lucanor, and Petrus Alphonsus his Disciplina Clericalis; and in them Bandello in Italy found the subjects of his Cento Novelle Antiohe. The same sources also in the main supplied Boccaccio with his material. The position

of Boccaccio in the history of the novel is important, not only because his Ameto is the earliest example of prose pastoral, and his Fiametta a revival of the romance such as it had been written by Heliodorus (of whom, however, Boccaccio knew nothing), but principally because in the Decumeron he discovered and taught to his successors the art of telling a story in literary prose.

A new factor in the history of prose fiction enters about the 15th century, in the shape of material derived from the great romance cycles, as in the Chansons de Gestes, the romances, and the tales of the Arthurian legend. Originally composed in verse, these legends came to be ultimately treated in prose; and to this process we owe a great cluster of tales, such as Huon of Bordeaux, The Four Sons of Aymon, and the great Morte d'Arthur of Sir Thomas Malory. About this time Spain was elaborating the great series of chivalric tales, of which Amadis of Gaul was the prototype; and the elaboration of this type of tale continued until Cervantes, in his immortal Don Quixote, laughed it out of existence. But Cervantes himself gave in his Galatea a specimen of another species, scarcely less artificial riz. the pastoral, a prose narrative, interspersed with songs, and dealing with the idealized loves of shepherds and shepherdesses. Boccaccio initiated this genre, and his influence, acting through the Arcadia of Jacopo Sannazaro, inspired in Portugal the Diana of Montemayor; and the emulation of this latter led to the Arcadia of Lope de Vega, the Astrée of D'Urfey, and the Arcadia of Sir Philip Sidney. And on the decay of the pastoral there arose in France a new school, commonly known as the heroic romance. Of all forms of fiction this is the most absurd. It was characterized, according to the dramatist Congreve, who himself essayed it, by 'lofty language, miraculous contingencies, and impossible performances;' while its extreme prolixity earned for it the nickname of the long-winded romance. Its chief interest lay probably in the fact that its earliest specimens—the Ibrahin and the Grand Cyrus of Madame de Scudéry, and the Polexandre of Gomberville-are really thinly-veiled transcripts of contemporary aristocratic life. The same means had frequently been previously employed to add interest to the pastoral. The interest to the pastoral. The heroic romance in England is represented by the Parthenissa of Roger Boyle, Sir George Mackenzie's Arctina, John Crowne's Pandion, and Congreve's Incognita. In France it provoked the satire of Scarron's Roman Comique and Furetiere's Roman Bourgeois.

In Spain there arose another form of fiction, which proved more permanent than those hitherto treated—viz. the picaresque, or rogue story. The original of this is found in The Life of Lazarillo de Tormes. which made its appearance about the middle of the 16th century. In Spain itself it was soon imitated by Mateo Aleman in Guzman de Alfarache, by Espinel in Marcos of Obregon, and by Quevedo in El Gran Tacaño; while Cervantes has some brilliant sketches in the same manner in his Novelas Exemplares. genre also passed into France, and there, in Le Sage's Gil Blus. it received its finishing touches. Nash's Unfortunate Traveller represents its entrance into England; and we may trace its progress through Defoe and Smollett up to Thackeray's Barry Lyndon. After this it is difficult to trace out the different kinds of narrative forms. Certain general influences are all that can be followed in the complexity of the material before us. The novel of domestic life, as we now know it, owes probably more to Samuel Richardson than to any other one man. Beginning almost casually with the writing of a series of moral letters, he gradually produced his epoch-making Pamela, a book which fixed the form of the novel for all his successors. His contemporary, Fielding, was a man of greater genius, but the influence he exerted abroad was not comparable with that of Richardson. Another form created and perfected in England was the tale of terror, which, from its beginnings in Horace Walpole's Castle of Otranto and The Mysteries of Udolpho, reached its final pitch in the works of Maturin and 'Monk' Lewis, unless indeed we allow Edgar Allan Poe to have given it an even higher devel-opment. In Sir Walter Scott, also, our nation gave to literature not only the inventor of the historical novel, but the greatest of all writers of fiction. And scarcely less original, in her own humbler way, was the quiet wit which Jane Austen carried with her into her scrutiny of the lives of commonplace people. Another fertile species of composition, which owes its origin to the Nouvelle Heloise of the philosopher Rousseau, is the novel of sentimenta species which counts among its most notable examples the Wer-ther of Goethe and the Rene of Chateaubriand.

The last fifty years have seen the flourishing of the novel to an extent greater than at any period of literary history. In France the names of Victor Hugo, George Sand, Balzac, Dumas, About, Flaubert, Daudet, and Prosper Mérimée attest its popularity, and the weight of intellect which it has attracted into its service. In England it has employed the genius of Thackeray, Dickens, George Eliot, Wilkie Collins, Trollope, Kingsley, Thomas Hardy, and George Meredith. And in this same period Russia has entered the lists of European literature in the person of her two novelists, Turgenieff and Tolstoy.

Lucian's Vera Historia, Rabelais's Pantagruel, Lyly's Euphues, and Swift's Gulliver's Travels have the outward form of tales, but their real interest centres in their satire or their moralizings and philosophy. The whole question of the legitimacy of utilizing the novel as a medium for conveying reflections on abstract matters and ventilating pet theories is one of the moot points of present-day criticism. There is a powerful school of modern critics who maintain that the duty of the novelist is simply to tell a story, and that if he stoops to didactic purposes he does so contrary to the true spirit of his art. But just as Milton attempted the epic in order to 'justify the ways of God to man, and Richardson had in view in his novels the inculcation of virtue and the presentation of actual models of conduct, so Meredith, in our own day, tells us it was 'the philosopher who led him on to the building of the three volumes.' And it would be difficult to point to modern novelists, whether Hardy, or Bulzuc, or Zola (the novelist of pure adventure being excluded), whose works are not moulded and inspired by certain precon-ceived theories. The truth is ceived theories. The truth is that the novel has become the veritable handmaid and drudge of literature.

See Dunlop's History of Prose Fiction (1814; new ed. by H. Wilson, 1888); A. Chassang's Histoire du Roman (1862); B. Tuckerman's History of English Prose Fiction (1892); Masson's British Novelists and their Styles (1859); W. Forsyth's Novels and Novelists of the 18th Century (1871); Sidney Lanier's The English Novel (1883); J. J. Jusserand's English Novel in the Time of Shakespeare (1890), Roman anglais du XVIII* Siècle (1886), and his Roman anglais et la Réforme de Defoe; W. Raleigh's The English Novel (1894); H. Courthope Bowen's Descriptive Catalogue of Historical Novels

(1882); W. Wagner's Epics and Romances of the Middle Ages (1883); C. Rehom's Der Deutsche Roman (1890); H. A. Rennert's Spanish Pastoral Romances (1892); T. Roscoe's Spanish Novelists (1832); Landau's Geschichte der Italienischen Novelle (1875); E. M. de Vogué's Le Roman Russe (1884); C. E. Turner's Modern Novelists of Russia (1889); Perry's A Study of Fiction (1903); and Nield's Guide to Historical Novels and Tales (1904).

Novelda, tn., Alicante, Spain, 15 m. N.W. of Alicante; is in a rich wine district, and has mineral springs. There are oil mills, soap factories, tanneries, brandy distilleries, and chocolate works. Pop. (1900) 11,388.

Novello, CLARA ANASTASIA (1818), English soprano singer, daughter of Vincent Novello, was trained at Paris, and won general admiration as a concert singer, and subsequently both in opera and oratorio, in England and on the Continent. She retired in 1860.

Novello, Joseph Alfred (1810-96), music publisher, son of Vincent Novello, founded in 1829 the London publishing house of Novello, Ewer, and Co. He did much to spread the knowledge of Mendelssohn's works in England, and was responsible for a new and cheaper method of musical printing. He retired in 1856.

Novello, VINCENT (1781-1861), English composer and musical editor, born in London; was for some time an organist there. Himself a composer of sacred music, he also edited sacred works of Haydn, Mozart, and other composers which were before unknown in England. The publishing enterprise which he undertook in 1811 was the forerunner of the present firm of Novello, Ewer, and Co.

Novello, Ewer, and Co.

November. See Year.

Novegorod, Old, or Great, city, N.W. Russia, cap. of Novgorod gov., 120 m. S.R. of St. Petersburg, close to Lake Ilmen. It is the seat of an Orthodox archishop, and is divided into two parts—that 'of the Merchants' and that 'of St. Sophia'—by the Volkhov, here navigable for large vessels. In the latter part is the Kreml, or citadel, containing the cathedral of St. Sophia (1045-52; restored 1893-1900) and other ancient churches, the archiepiscopal palace, and the Rurik monument (1862). The cathedral's famous 'Gates of Korsún' traditionally date from 988, when the Grand Prince Vladimir transported them from Kherson (Sevastopol) in the Crimea; some consider them to be German work of the 12th century, a present from Hanseatic cities.

The Sigtuna Gates are 12th-century war spoils from Sweden (1188). Outside the Kreml is the palace of the nobles, the palace of Catherine II., the present imperial palace, the town hall with a museum of Russian antiquities, the ruined tower of Yaroslav or of the Vyeche, the Znamenskii church of the 14th century, and the convent of St. Antony (1106). The merchants' quarter was the scene of the popular assemblies, or Vyeche, of the Novgorodian republic. Together with Kiev, Novgorod was the chief centre of the Russian people in pre-Tartar days; its connection with Scandinavian countries was very close in the 9th, 10th, and 11th centuries. Gradually it became a democratic republic, especially after 1270. Its trade and prosperity were very great during the middle ages; here was the chief castern Hanseatic settlement. In 1471 and again in 1478 it was subjugated by Moscow (Ivan 111.), and in 1570 finally ruined by Ivan IV., 'the Terrible.' Pop. (1897) iv., 't 26,095.

Novgorod-Syeversk, tn., Chernigov gov., S.W. Russia, 110 m. E.N.E. of Chernigov city, on r. bk. of Desna. It contains an Orthodox cathedral (1671) and a college (1808). Tanneries, soap factories, and brick works are the chief industrial establishments. It is one of the oldest towns in Russia. Pop. (1897) 9 185.

Russia. Pop. (1897) 9, 185.
Novi, tn., prov. Alessandria, Italy, 13 m. s.e. of Alessandria. It trades in silk. In 1799 the French were defeated here by the Austrians and Russians. Pop. (1901) 17,868.

Novibazar, or Novipazar (Turk. Yenipasar), tn., European Turkey, 120 m. s.e. of Bosna-Serai. East of the town lie Roman baths and an ancient Servian church. In the middle ages the town occupied an important place in Servian history. It is of great strategical importance as commanding the roads between Bosnia, Roumelia, and Servia. Pop. 12,000.

Novikov, Madame Olga, née Kiréev (1841), Russian political journalist and author; has laboured to effect a rapprochement between Russia and England. In England she made many influential friends, including Gladstone and Carlyle. As 'O. K.' she has been a constant contributor to English journals, and has also published Is Russia Wrong? (1878), Russia and England (1880), Friends or Foes? (1878), and Skobleff and the Slavonic Cause (1883).

Novo-Cherkask, cap. of Don Army territory, S. Russia, 20 m. by rail N.E. of Rostov, with vinegrowing, fishing, cattle-raising, brick-making, and flour-milling.

An Orthodox cathedral has been building since 1893; the library and museum illustrate the history of the Don Cossacks. There are coal mines in the vicinity. Pop. (1897) 52,005.

Novo-Georgievsk, or KRYLOV, tn., Kherson gov., S. Russia, 27 m. N.N.E. of Alexandriya, on the Dnieper. Pop. (1897) 11,214.

Novo-Georgievsk, or Modlin, tn., Plock gov., Russian Poland, on r. bk. of Vistula, 19 m. N.W. of Warsaw. About 21 m. to the N. is a first-class fortress, forming with Warsaw, Ivangovod, and Bust-Litovsk, the 'Polish quadrilateral.'

Novograd-Volinski, tn., Volhynia gov., W. Russia, 65 m. W.N.W. of Jitomir, with tanneries, brick works, tobacco and candle factories. Pop. (1897) 16,872, half Jews.

Novo-Moskovsk, tn., Ekaterinoslav gov., S. Russia, 18 m. E.N.E. of Ekaterinoslav city, on r. bk. of Samara. Pop. (1897) 12,862.

Novo-Radomsk, tn., Piotrkov gov., Russian Poland, 25 m. s.s.w. of Piotrkov, on r. bk. of Warta. It has a fine town hall and an old Franciscan convent. There are manufactures of wool, cloth, and furniture, also tanneries and sawmills. Pop. (1897) 12,407.

Novorossiisk, Russian port on Black Sea, 60 m. by rail s.w. of Ekaterinodar. In 1722 a for-tress was erected here by the Turks. Novorossiisk was built in 1838, and bombarded by the allies in 1855. The exports are mainly petroleum and oil products, cereals, and wool. Pop. (1897) 16,208.

Novo - Uzensk, tn., Samara gov., E. Russia, 110 m. s.e. of Saratov, with tallow manufacture and sheepskin dressing. Pop. (1897) 13,475.

Novo-Zybkov, tn., Chernigov gov., S.W. Russia, 100 m. N.N.E. of Chernigov city. It has manufactures of tallow candles, oil, bricks, sailcloth, ropes, carts and carriages, pottery, and wax. Pop.

(1897) 15,480.

Nowgong. (1.) District, Eastern Bengal and Assam, with an area of 3,843 sq. m. and a popula-tion (1901) of 261,160. It produces tea. (2.) Chief town of the above, on Kalang R., a left-bank tributary of the Brahmaputra, 60 m. E. of Gauhati. Pop. (1901) 4,430. (3.) Town and cantonment, Bundelkhand, Central India. Its Raj-kumar College was established by native chiefs of Central India in memory of Lord Mayo. Pop. (1901) 11,507.

Nox (Gr. Nyx) was, in ancient mythology, the personification of night; she was held to be the daughter of Chaos, the sister of Erebus, and the mother of Æther (Heaven) and Hemera (Day).

Noya, maritime tn., Corunna, N.W. Spain, 45 m. s.w. of Corunna. There are manufactures

of paper, lace, linen, and soap. Pop. (1900) 9,791. Noyades, LES (Fr. 'drownings'), a series of wholesale destructions devised and carried out by Carrier, agent at Nantes, for the extreme revolutionists (1793). The failure of the insurrection of La Vendée supplied numerous victims, and these were sent out into the Loire on board a ship with a movable bottom, the sudden withdrawal of which dropped the prisoners into the water.

Noyeau, or CREME DE NOYAU, a French liqueur of the cordial class, made from grape alcohol or brandy, sweetened with pure cane sugar and flavoured with crushed peach stone kernels. Pink and white varieties are produced, and for both Martinique has long been famous. It is of a dry rather than sweet character.

Noyes, John Humphrey (1811 -86), American perfectionist and communist, was born at Brattleboro, Vermont, and founded a community, removed in 1848 from Putney, Vermont, to Oneida, New York, the free ideas of which with regard to marriage and the holding of property were in 1880 forced to undergo modifications. He published The Second Coming of Christ, Salva-tion from Sin the End of Faith, and a History of American Socialism.

Noyon, anc. tn., dep. Oise, France, 67 m. by rail N.N.E. of Paris. Here Calvin (1509-64) was born, Pop. (1901) 7,443,

N.P., Notary Public.

N.S., abbreviation for New Style in the calendar (in Great Britain since 1752); Nova Scotia; National Society.

N.T., New Testament.

Nubar Pasha (1825 99), Egyptian statesman, was born of Armenian parentage at Smyrna. Educated by the Jesuits, he became chief secretary to Ibrahim Pasha, and subsequently to Abbas Pasha. While under Ismail Pasha he carried through the negotiations for the completion of the Suez Canal. Appointed minister of foreign affairs in 1866, Nubar induced the powers to consent to international law courts in Egypt, instead of the maintenance of national courts for the trial of foreigners. He held office under Earl Cromer in 1884 88 and 1894 6.

Nubia. After the fall of the Æthiopian kingdom of Meroë, about the middle of the 1st century A.D., the Blemmyes, tribe of Hamito origin, raided the southern borders of Egypt, and for some years dominated the Thebaid, until they were ex-

pelled by Probus (276-282). Diocletian invited the Nobatai, a negro tribe, to settle above the first cataract and hold the Blemmyes in check. Probably it is from this people that the name of the country, Nubia, was de-rived, and not from an Egyptian word nob or nub, signifying gold. The Nobatai founded a kingdom the capital of which was (Old) Dongola, and about A.D. 545 were converted to Christianity. The Arabs besieged Dongola in 652, and forced the Nubians to pay a tribute of slaves. But the Nubians practically maintained their independence until the 14th century, when their kingdom was overthrown by the Arabs with the assistance of a detachment of Bosnians, who settled in the country. Christianity was extirpated, and the numerous tribes, Arab, Hamitic, and negro, were subject only to their own chiefs until 1820, when Ismail Pasha annexed the country. Lower Nubia extends from Assouan to Dongola, and as far as Wady Halfa is now incorporated with Egypt; Upper Nubia, thence to Sennar and the frontier of Abyssinia. See further under SUDAN.

Nucleus. See CELL and Pro-TOPLASM.

Nueces, riv., Texas, U.S.A., rises in s. of state, and flows generally s.E. to Corpus Christi Bay, an arm of Gulf of Mexico. Length, 310 m.; drainage area, 18,944 sq. m.

Nueva Caceres. See CACERES. Nuevitas, tn., Prov. Puerto Principe, on N. coast of Cuba, 140 m. N.W. of Santiago, Ma-hogany and other timbers are exported. Pop. (1899) 4,228.

Nuevo Leon, state, Mexico, on N.E. slopes of E. Sierra Madre, covering an area of 23,592 sq. m., and yielding grain and sugar cane. The rainfall is 130 in. The chief town is Monterey. Pop. (1900) 326,940.

Nugent, JAMES (1822 - 1905), English philanthropist, bern at Liverpool and educated at the Roman Catholic College of St. Cuthbert, Durham. He estab-lished in 1872 the Catholic Total Abstinence Lergue of the Closs. of which many branches have since been formed in the United Kingdom and the United States. Nugent also founded the "Save the Boy" Refuge and a Magdalene Home.

Nuisance. In England a private nuisance is one which affects an individual or a certain number of persons, while a plublic or common nuisance affects the public at large. Private nuisances include all injuries, except trespass, which interfere with an owner or occupier in the reasonable enjoyment of his property. Thus it may be a nuisance to erect alkali works, to have a smoky chimney, to divert water from its channel, to burn lime, to use a dwelling-house as a stable, to play a musical instrument incessantly, or to interfere with easements. But the nuisance must be appreciable, and such as a reasonable and not over-sensitive man would take exception to, and the court will have regard to the nature of the locality. Further, a nuisance must also be either continuing or irreparable. The remedies for a nuisance are: -(1.) Abatement. The person aggrieved may take the law into his own hands, as by pulling down a sluice whic't diverts a watercourse. (2.) An injunction restraining the continuance of the nuisance. (3.)

Damages. A public nuisance has been defined as 'an act not warranted by law, or an omission to discharge a legal duty, which act or omission obstructs or causes inconvenience or damage to the public in the exercise of rights common to all his Majesty's subjects' (Stephen's Digrst). It differs from a private nuisanca in the following respects: (1) It is a criminal offence as well as a civil wrong; (2) a privat: person cannot bring an action unless he can prove special damage; (3) a right to commit a private nuisance may be acquired by prescription, but not a right to commit a public nuisance. Examples of public nuisances are the obstruction of a highway, the pollution of a river, keeping a disorderly house, or carry ing on an offensive trade. Public nuisances are indictable offences, prosecuted on the information of the attorney-general; but a large number of nuisances are now statutory offences under the Public Health Acts, and the proceedings are summary. The Scotch law with regard to nuisances is very similar, but there is no distinction between public and private nuisances. The remeand private nuisances. The remdies are interdict and damages.

Nukha, tn., Russian Transcaucasia, Elizavetpol gov., on s. slope of Caucasus, 60 m. N.E. of Elizavetpol. Silk is produced and spun. Pop. (1897) 24,811, chiefly Tartars and Armenians.

Nullity of Marriage. Certain marriages are voidable—i.e. they may be declared null and void by a court of competent jurisdiction in proceedings taken by one of the parties to the mar-riage during the lifetime of both. Unless and until such a declaration has been made, voidable marriages are valid for all purposes. The grounds of such proceedings for nullity of marriage are (1) impotence, and (2) absence of consent, arising from error, fraud, or duress. In these cases

the proceedings must be taken by the party alleging the im-potence of the other, or alleging the absence of consent by reason of his or her error, or the fraud or duress of the other party. But some marriages are not only voidable, but void ab initio; and in these cases proceedings may be taken, not only by the parties to the ceremony of marriage, but by other persons interested, and either in the lifetime or after the death of the supposed husband and wife. The impediments which render marriages void are (1) nonage; (2) insanity; (3) consanguinity and affinity, or relationship within the prohibited degrees; (4) previous marriage still subsisting, and, in Scotland though not in England, (5) adultery between the parties which has been the ground of the dissolution of the previous marriage of one of them; and (6) non-residence in Scotland for the twentyone days required in the case of an irregular marriage by 19 and 20 Vict. c. 95. In Scotland, though not in England, the children of such putative marriages are legitimate if one or both of the parties went through the ceremony in good faith, in ignorance of the fact that any impediment existed.

Nullum Tempus aut Locus occurrit Regi. It is a constitutional principle that the crown cannot lose its rights either in civil or in criminal matters by delay or negligence. Thus, easements cannot ordinarily be acquired against it by prescription. To the general rule there are numerous statutory exceptions; and by the Nullum Tempus Act, 1768, amended in 1862, a sixty years' possessory title to land is good.

against the crown.

Numa Pompilius, the second king of ancient Rome, and the successor of Romulus. The trasuccessor of Romulus. The tra-ditional date of his reign was from 715 to 673 B.C. He was a native of Cures in the Sabine country. He was famous for his wisdom and piety, and is said to have been advised by the nymph Egeria. He established the sacred guilds of the Pontifices, the Augurs, the Flamines, and the Salii, and instituted the Vestal Virgins. He built a temple of Some authorities re-Faith. garded him as a mere personification of law (in Greek, nomos).

Numantia, tn., Spain, which stood on a hill, and for twelve years (from 145 to 133 B.C.) resisted all attempts at its capture by the Romans. At last Scipio the younger starved it into surrender. It is supposed that the modern Guarray is built on its site. Number of the Beast, THE.

or APOCALYPTIC NUMBER, is 666 (Rev. 13:18). The interpreta-

tions of this passage generally rest on the fact that in Hebrew and Greek the letters of the alphabet did service for numbers; hence a writer, while avoiding a direct mention of some person or thing, could yet indicate the same by a number which was the sum of the various values of the letters composing the name. Irenaus mentions the Greek word Laternos (i.e. 30 + 1 + 300 + 5 + 10 + 50 + 70 + 200), as supposed to be intended by 666; it denominated the Latin (i.e. Roman) em-The combination NRON QSR (the consonants of the Helicw for Nero Cæsar; O as a long vowel is represented by a letter-see HEBREW LANGUAGE) has, however, met with a more general acceptance, as it works out thus: 50 + 200 + 6 + 50 + 100+60 + 200 = 666. A well-known alternative reading is 616, which again is composed of the values of (Gr.) GAIOS KAISAR-i.e. the Emperor Caius Caligula. That 'it is the number of a man' does not necessarily imply that a definite individual is meant, but rather that it is to be interpreted according to the value of the letters. In any case the number points to some manifestation of antichrist, and perhaps Nero best fulfils all the conditions.

Numbers, the fourth book of the Pentateuch, derives its name from the fact that it recounts two enumerations of the Israelites (ch. 1 f. and 25). The book may be divided as follows: (1) Ch. 1:1-10:10, numberings and laws made on the eve of the departure from Sinai: (2) 10:11-20:13, the wanderings in the wilderness; and (3) 20:14-36:13, the conquest of the land east of the Jordan, and the legislation given on the plains of Moab. The two main sources are P and JE; ch. 13 and 14 (the narrative of the spies) furnish an interesting example of the combination of sources. See HEXATEUCH, and

literature cited there.

Numbers. There is no more difficult mathematical problem than to define what number really is, and how its origin and essence should be logically regarded. Here, however, we shall confine our attention entirely to some of the simpler aspects of what is called the theory of num-The most fundamental classification of numbers is into prime and composite—the former having no factors except unity and the number itself, while the latter is factorizable into two or more factors differing from unity. Thus 1, 2, 3, 5, 7, 11, 13, 17, 19, 23, etc., are prime numbers: 4, 6, 8, 9, 15, etc., are composite. Every prime except 2 is necessarily an odd number, so that after 2, 3, no two primes can be

consecutive numbers. Also no prime can end in 5 except 5 itself. There is no known method of tabulating the prime numbers except the laboriously mechani-cal one of striking out from the series of natural numbers the multiples of the successive primes, 2, 3, 5, 7, 11, etc. There are 167 primes (excluding unity) below 1,000. Fermat (1601-65) enunciated several curious theorems which bear his name. One of these is that if p is a prime of these is that n_p is a prime number, and n any number prime to p-i.e. not divisible by it—then $n^p-i.e.$ to divisible by p. For example, with p as 5 and n as 7 we have $7^i-1=2,500$. Another of Fermat's theorems is that a prime number which can be expressed in the form 4n+1, n being an integral or whole number, can be represented in one ber, can be represented in one way, and in one way only, as the sum of two squares. Thus 13, which is $4 \times 3 + 1$, is also equal to $3^2 + 2^2$. Similarly $557 = 4 \times 139 + 1 = 19^2 + 14^2$. This theorem refers to a branch of the general theory of numbers known as the partition of numbers into sums of squares or cubes or any other integral powers of numbers. Fermat's 'last theorem,' that it is impossible to find integral values of x, y, z, which will satisfy the equation $x^n + y^n = z^n$, when nhas any integral value higher than 2, is another example of partitions. The theorem has been proved for all values of the exponent up to 100; but a general proof has still to be given. The simplest quadratic partition of a square number constitutes the a square number constitutes the well-known Pythagoraan prob-lem—viz. to find right-angled triangles whose sides are com-mensurable. It can be shown that all integral values x, y, z, satisfying the equation $x^2 + y^2 = z^2$, can be constructed from the formulæ

$$x = l(m^2 - n^2), y = 2lmn, z = l(m^2 + n^2),$$

l, m, n being integral numbers of which m and n are prime to each other. Thus m=2, n=1, give for l=1 the values 3, 4, 5. Change m to 3, and the values are 8, 6, 10, multiples of the last set. With 3 and 2 for m and n, we find 5, 12, 13, and so on. So far we have considered only integral numbers—i.e. numbers which find a place in the series of cardinal numbers. 1, 2, 3, 4, and so on indefinitely. Any number which can be expressed as the ratio of two integral numbers is called a rational number. But there are numbers, such as the square roots of the great majority of integral numbers, which cannot be so expressed, and which are called irrational numbers. Thus $\sqrt{3}$ is irrational; but 0°333...

or 0.3 is not irrational, for its value is $\frac{1}{2}$. Two of the most important irrational quantities are the ratio of the circumference of a circle to its diameter, usually written π , and the base of the Napierian system of logarithms, symbolized by the letter ϵ . See H. J. S. Smith's Collected Papers (1894), and Mathew's Theory of Numbers (1892).

Numerals. Primitive man represents numbers by notches on a stick, and the earliest numeral signs are simply perpendicular strokes. Strokes of this character are the primary element in the earliest Egyptian, Cuneiform, Semitic, Indian, and Roman systems. But for very large numbers new symbols are invented. When a decimal system is employed, the next step generally is to invent a symbol for 10, or even for 5, and then symbols for 100 or 1,000. At this stage the first letter of the word for the new number to be represented may be taken as the symbol of the number. (See below.) When an alphabet is already in use, a complete series of numerals is sometimes obtained by giving each successive letter a numerical value corresponding to its position in the alphabetic arrangement.

Arabic Numerals.—The numerals we now generally use are known as 'Arabic numerals,' because they were borrowed in the 12th century from the Arabic scholars of Spain. In the 8th century they reached Bagdad from India, where the principle of varying the value of the numeral according to its position (as in 2, 20, 200) seems to have been introduced perhaps as early as 500 A.D. (Burnell). The figures themselves are at least some centuries older, being descended from what are known as the Indian cave numerals. These were preceded by, and may possibly be a development of, yet older signs, in which only perpendicular and horizontal strokes were employed (3rd century B.C.).

Roman Numerals.—The primitive character of the symbols, I, II, III, IIII, is still quite plain. The other signs in use in this system are V, X, L, C, D, M. X is probably the earliest of these, and may simply be I crossed. C and M stand for centum and mille respectively, but they are substitutes for earlier forms * and * or (X). These appear to be modifications of the number X. For 1,000 \$\Delta\$ is also used, and \$\Delta\$ (even in early printed books). V, L (originally \$\Delta\$, and D (originally \$\Delta\$ or \$\Delta\$) appear to be simply halves of the symbols for 10, 100, and 1,000, as already given. The derivation of any of these signs from the Greek alpha-

bet is improbable (Zangemeister). The use of forms like IV, IX, XC is a late development.

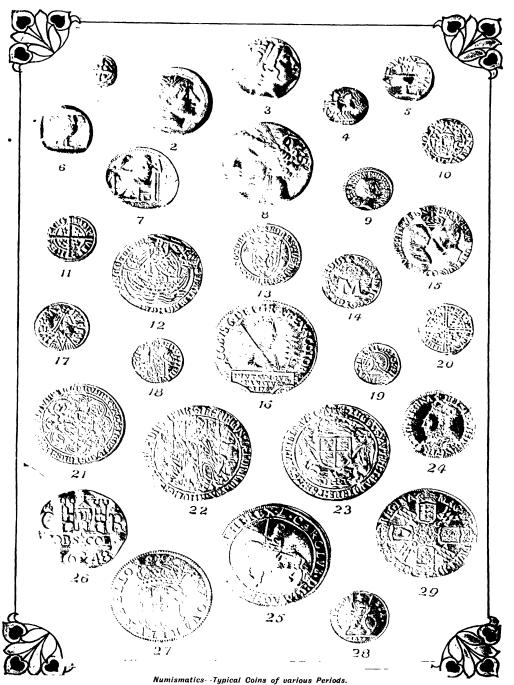
XC is a late development. Greek Numerals.—The oldest Greek system closely resembles the Roman. The symbols in addition to I are II, \triangle , H, X, M, which are the initial consonants of the Greek numbers ξ , 10, 100, 1,000, and 10,000 respectively. Il enclosing \triangle stood for 50 and enclosing H for 500. From the 3rd century B.C. this system was replaced by an alphabetic system in which 1-9 were represented by the letters $a-\theta$, the tens by $i-\nabla$, and the hundreds by $\rho-\nabla$. In the alphabet so utilized there are twenty-seven letters, the obsolete consonants f, ∇ , and ∇ being retained in the 6th, 18th, and 27th places respectively. (See AlphaBET.)

Early Semitic Numerals.-One system is common to the Aramean, Phenician, Palmyrene, and Nabatean inscriptions, and it may have been still more widely diffused. It occurs first in the earliest Aramæan inscriptions (8th century B.C.). The numbers 1-9 are represented by perpendicular strokes, and the tens by horizontal strokes; there are special signs for 100 and 1,000. A combination of two tens produced a sign for 20, and a separate sign for 5 also exists. The earliest known Arabic system is alphabetic, like the later Greek. (See above.) The Jewish numeral system is alphabetic. It occurs first on the coins of the Maccabees (2nd century B.C.). See Isaac Taylor's The Alphabet (1883), vol. ii. pp. 263-268; A. C. Burnell's Elements of South Indian Palacography (2nd ed. 1878); K. Zangemeister's Entstehung der römischen Zahlzeichen, in Sitzungsb. der k. Preus. Akademie (1887); M. Lidzbarski's Handbuch der Nordsemit. Epigraphik (1898); Capelli's Lexicon Abbreviaturarum

Numidia, country in N. Africa, between the territory of Carthage on the E. and Mauritania on the W., thus forming part of modern Algeria. Its wandering inhabitants were called Nomades by the Greeks, and this name, Latinized as Numidæ, led to the name of the country. They were at first subject to the Carthaginians, but from 201 to 46 B.C. were under a native monarchy, in alliance with Rome; in the latter year, however, Julius Cæsar made their

country a Roman province.

Numismatics, the science which treats of coins and medals. Coins are pieces of metal of fixed weight, bearing a government stamp, and used as a circulating medium. Medals are pieces struck—not necessivily by government—to commemorate an event. The



Ancient:—1. Phemician half-stator. 2. Silver coin of Anticchus 11. (Theos). 20. 248 n.c. 3. Silver coin of Selencus 111. (Cerdunus). 228-222 n.c. 4. Gold coin, Parthia, 330-226 n.c. 5. Jerusalem, silver shekel, 133-135 n.c. 6. Athena, silver tetradrachin, 8th century n. 7. Alexander the Great, tetradrachin, 360 n.c. 8. Carthage, silver checked 133-135 n.c. 6. Athena, silver tetradrachin, 8th century n. 8cottish:—10. Silver penny, William the Lion, Edinburgh, 1165-1214. 11. Silver penny, Alexander 111. 1249-85. 12. Gold nobl., David 11. 1329-71. 13. Gold 8t. Andrew or Lion, Robert 111, 1304-1468, 14. Silver penny, Alexander 111. 1249-85. 15. Gold ducat, Mary, 1558. 16. Gold twenty pound piece, James vr., 1576. Anglo-Saxon:—17. Silver, Anfired of Wessex, 18. Edward the Confessor, Sovereign type, Ancient Irish:—19. Penny, Dublin, 98-21029. English:—20. Gold penny, Henry 111, 1257. 21. Silver noble, Edward 111, 1344. 22. Gold sovereign, Henry vii. 1489. 23. Gold sovereign, Colchester, 1548: Royalist coin, Charles 1. Gold. Silver noble, Edward 111, 1543. 28. Silver crown, Charles 1. Is31. 28. Silege piece, gold half-sovereign, Colchester, 1548: Royalist coin, Charles 1. 27. Silver crown, Commonwealth, 1653. 23. Copper farthing, James 11, 1684. 29. Silver crown, William and Mary, 1691.

metals used are gold, silver, and copper, and alloys of these, such as electrum, which is an alloy of gold and silver, billon, bronze, The earliest coins and potin. were very thick, ill-shaped pieces, upon which, by means of a handpunch, a more or less rude im-

press was struck. In the fully-developed coin there occur several distinct parts, which are technically described as follows: -Obv. = obverse, that side of the coin bearing the head or bust of the ruler, hero, or divinity specified by the origin of its mintage; Rev. = reverse, the opposite face of the coin, bearing a symbol or commemorative figure or group of figures with an appropriate legend. The obverse usually bears the name of the ruler in a line surrounding the border. Field is the term used to denote any clear space not occupied by the principal design. Exergue is the space separated from the lowest portion of the central design; it usually bears the date and sometimes also the mint-mark (m.m. or M.M.).

The earliest coins were struck in that portion of Asia Minor anciently known as Lydia. As early as 716 B.C. Lydian coins in electrum were in circulation, and continued to be so till 652 B.C. This very early money bore the head of a lion. Later, gold and silver coins were instituted by Crossus, king of Lydia; and in strong contrast to the very small. dumpy, ill-shaped electrum specimens, many specially fine examples of the numismatic art were struck in such cities as Acrasus, Bagis, Briula, and Germe. The coinage of the Seleucid kings of Syria came into use about 312 B.C., and, after running through seven distinct series, closed with the reign of Antiochus, 65 B.C. These coins are specially noteworthy for the large variety of symbols used on their reverses. Fine workmanship is displayed in some of the larger pieces of Antiochus II. and Seleucus III. The coins ranged in size from In of an inch to 11 inches in diameter. The principal Greek coin was the gold stater, which was equivalent to six silver drachmæ or to thirty-six oboli in copper. The earliest Greek coins, with the exception of the Lydian, bear as inscription the initial letter of the city of origin; the first coin bearing the name of a king is the tetradrachm of Alexander of Macedon. Persian coins date from the year 1502, and after being in currency throughout the 226 ourrency throughout the 226 years of the Safavi dynasty, terminated. Fine gold coins of Sulaiman I., of Husain, and of Kajar-Nasir-ed-Din are extant, the largest being 3; inches in di-

ameter. The dates of Parthian coins are given as beginning with Arsaces I., 255 B.C., and closing in 227 A.D. Tetradrachms and drachms in silver were the principal coins. The majority are only rudely circular, and their copper or brass coins were quite insignificantly small and sometimes squarish. The largest measures 1% inches and the smallest f inches in diameter. In Jewish coins three epochs are distinguished. The first, struck at the time of Alexander the Great, were of copper, and are of extreme rarity; the second group were coined by Mattathias, 169 B.C., and were current until the date of Antigone, 37 B.C. Idumæan dynasty instituted the third, the earliest coins of which were struck in the epoch of Herod the Great, 40 B.C., and the latest during the reign of Vespasian, 134 A.D. Coins of the imperial colonies of Marcus Aurelius and Trajan are also in the category of Jewish coins, which terminated with Hostilianus, 251 A.D. There are fine and interesting pieces commemorative of the Jewish revolt during the period of Simon Barcochab (Bar-coziba). The coins of the Romans are divisible into three important classes-(1) the republican, (2) the family, and (3) the imperial. Most of the republican coins were of bronze, and belonged to the early period of Roman culture. At about 170 B.C. the family coins came in; these were marked usually by symbols of events occurring in the great family, the members of which had hereditarily held office in the mint. Imperial coins, chiefly in gold and silver, represent a very great variety in size, and in the style of their execution, as well as in the choice of the subject delineated. The art on the coins of Augustus and Nero is specially fine; with the reign of Commodustheart reached its climax. Copper coins washed with silver were the invention of Gallienus.

Mediæval European coins find their most specific representative in the denier, or silver penny, a coin that came to be issued by feudal lords and ecclesiastical princes as well as by sovereigns. After the municipal corporation had, in the 13th and 14th centuries, begun to issue their own coins, a thin piece, called a bracteate, came largely into circulation, both on the Continent and in England; but there can be no doubt that, centuries earlier, the inhabitants of the British Isles, previous even to the true Anglo-Saxons, had a coinage of their own. These coins were of silver, and were, in short, somewhat coarse imitations of Grecian and Macedonian coins brought into England by Phoenician trade. They are small, rudely circular, and thick. On the very earliest specimens, which are unlettered, the head or the figure of a horse is nearly always present, some-times in combination with a man wielding a battle-axe. specimens bear such lettering as CAIII, which may mean Camelo-dunum, or TIGII, for Tiguocobauc, the earliest name of Nottingham. The best examples were struck by Cunobeline, after whose date lettering on these coins became constant. The coins of the Anglo-Saxon heptarchy range in time from Hengist (454 A.D.) to Edgar (959). About eighty different mints are known. These coins consisted of (1) skeattas, (2) stycas, (3) heptarchical pennies, and (4) ecclesiastical pennies. All of them are rare, and about sixty-five are known to be unique. The Anglo-Saxon coins have been frequently found in large hoards, of which the following are the most considerable: (1) in Hexham churchyard, about 8,000 stycas; (2) at Kirkoswald, about 800 stycas; (3) in a silver cup found at Halton Moor, Lancaster, were 860 silver pennies and 6 gold coins, 379 of which were of King Cnut; (4) in Co. Wexford, about 1,600 stycas mixed with Hiberno-Danish coins. Skeattas and Skeattas and stycas were the smallest, measuring in diameter only nine-six-teenths of an inch. Stycas have been fairly frequently found in the sandy shores of Scotland, as, for example, near Glenluce, Wigtownshire. Though Greek, Roman, and Carthaginian coins have been found in Ireland, none that can be rightly attributed to the Irish rulers themselves are known prior to the arrival of the Danes. As in many other countries, rings of metal, perhaps also fibulæ (brooches of a special type), were used as a monetary currency. This is borne out in part by historic evidence of payments having been made by the ounce of gold, and also by the dis-covery of enormous quantities of metal rings, as, for example, a large cart-load of them in a tumulus in Co. Monaghan. The Hiberno-Danish coinage began with Anlaf I. (853 A.D.), and closed with Magnus, who was slain 968 A.D. These coins are of an average diameter of about three-quarters of an inch, are well contoured and neatly lettered, the earliest being the largest. In England, the beauty and ornate style of many of the coins of Edward III. are very marked in comparison with previous coinages. It is on coins of this king that there first appear the words 'Dei Gratia' and the title 'Rex Franciæ.' Coins of gold called nobles and

angels were the special feature of this period. The sovereign, or double ryal, was first coined by Henry VII. (1485-1509). Henry VIII. first used the title 'Hiberniæ Rex.' During the reign of Elizabeth coins were for a time made by the mill and screw. Cromwell issued some fine coins, but to a small extent only; they show his laureated bust and title as protector, and on the reverse a crowned shield, with the harp and the crosses of St. George and St. Andrew. During George IIII.'s reign few new coins were minted in silver. The principal recent feature in the coinage of Great Britain was the issue of the two-shilling piece, or florin, which was regarded as a step in the direction of a decimal system.

One of the most complete collections of coins is that now preserved in the National Museum of Antiquities of Scotland. The earliest Scottish coin known is the sterling or penny of David I., showing a crowned bust with sceptre in front, and on the reverse a cross fleurie within inner circle, and a pellet in each angle. It was struck at Berwick (1124-53). With William the Lion came in the crescent and pellet coinage (1165-1214) and the short double cross coinage. Alexander III. introduced the long double cross and long single cross (1249-85). Great variety in design and value distinguishes the numerous coins issued by David II. (1329-70). The trefoil-pointed tressure on coins struck at Perth came in during the reign of Robert III. (1390-1406), a very large number of whose coins are extant. The silver coinage of James 1. (1406-36) was also extensive, and there were mints at Edinburgh, Linlithgow, Perth, and Stirling; and his gold demy and half-demy are beautiful pieces. James III. issued certain gold coins stamped with his own figure in armour, on horseback, with drawn sword, hence called 'riders,' and others called 'unicorns,' showing a unicorn supporting a shield charged with the Scottish arms. Crowns, pattern ducats, and bonnet pieces are characteristic of James V., who appears also to have introduced bawbees and half-bawbees. The silver coinage of Mary, Queen of Scots (1542-67), consisted, before her marriage to Francis, of festoons of several varieties; one displayed her crowned bust, another simply a large M crowned, and a third the Scottish escutcheon, crowned, between M and R. Her gold between M and R. Her gold coinage was of abbey crowns, twenty and forty-four shilling pieces, twenty-two shilling pieces, and ryals or three-pound pieces. Mary's coinage was extensive, varied, and rich. In 1579, during the reign of James VI. (1567-1625), the famous legend Nemo me impune lacessit, with a large-leaved thistle between I and R, was introduced, on two-merk and one-merk pieces. This king issued twenty-four varieties of silver coins and ten in gold, the largest of the latter being a twenty-pound piece; lion and thistle nobles are also characteristic of this period. Charles I. issued a large number of coins, several of which are grouped under specific names, such, for example, as the hammered coinage of 1636, milled coinage of same date, Briot's milled coinage of 1637, and Falconer's coinages. In the next reign dollars or fourmerk pieces came in. During the brief reign of James VII. (1685 9) the old legend conveyed by the letters SCO. ANG. FRA. ET. HIB.REX gives place to MAG. BRIT. FRA. ET. HIB. REX under date 1687. William and Mary (1689-94) issued silver coins of values ranging from five shillings to sixty shillings (Scots), and Queen Anne a number chiefly remarkable for their plainness and lack of variety and style. See Burns's Coinage of Scotland (1887); Cochran-Patrick's Records of the Coinage of Scotland (1876); A. B. Richardson's Catalogue of Scottish Coins (1901); Gardner's Cata-logue of Greek Coins (1883); Coins of the Ancient Britons, by Sir John Evans (1864); De Saulcy's Numismatique Judaïque (1854); Lindsay's Hist. and Coinage of the Parthians (1852); the various British Museum coin catalogues by Head and Poole; and Head's Historia Numorum



Section of a Nummulite.

Nummulites, a genus of foraminifera abundant in the Eocene, but found also on rocks as old as the Carboniferous limestone. The shells, which are in some species one or two inches in diameter, are flattened, circular, discoidal, resembling coins. Their outer surface has often a fine grooving or other ornamentation; but when the shell is broken through the middle, it shows a large number of chambers spirally arranged, and forming a beautifully regular pattern.

Nummulitic Limestone. In S. Europe, N. Africa, and over a wide part of Asia the Ecoene formations are characterized by the large development of white or creamy limestones, which consist almost entirely of the coinshaped shells of the giant foraminifer nummulites. The pwanids of Egypt are built of this material. It is found also in Mexico and the W. Indies.

Nun, a member of a religious order for women, living under rule, and bound by vow to the service of God. The first convent for women was founded (4th century) in the Egyptian desert by the sisters of Sts. Antony and l'achomius. St. Jerome tells us that in Rome a number of patrician ladies, guided by a widow named Marcella, lived (end of 4th century) there apart from the world, under rule, and bound by the vows of poverty and chastity. Besides the ancient contemplative orders for women, the needs of the church and society in modern times have given rise to the various active orders -e.g. Sisters of Mercy and Siste s of Notre Dame. The superiors of the various orders for women are ordinarily elected by a chapter of their own body. They bear the title of mother-general, abbess, prioress, rev. mother, sister-superior. Unless their house belongs to the class of the exempt, they and their communities are under the bishop's jurisdiction. See Monasticism.

Nunc Dimittis, the name, taken from the first words of the Latin version, of the song of Simeon (Luke 2:29-32). It forms part of evening prayer in the Anglican Church, and it is used in the Greek Church and in the Roman Catholic Church.

Nuncio, or Legate, a papal ambassador, representing the Pope at the court of a sovereign, if not a cardinal. If a cardinal, he has the title of legate. In the Roman empire the legates assisted the proconsuls and proprætors in the provinces. The title was also given to the officer who was next in rank to the commander-inchief on any military expedition, on whom, in his superior's absence, devolved the command. The Romans also styled political ambassadors legati. While the popes held temporal power in Italy, legatia latere were sent as governors of the papal provinces, which were known as legations

when ruled by a cardinal.

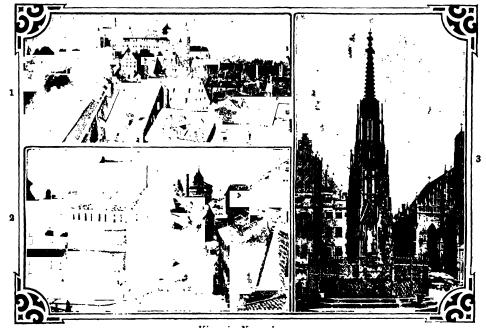
Nuncupative Will is an, oral
will. Since the Wills Act, 1837,
such wills have been abolished,
except in the case of soldiers and
sailors on active service. (See
WILL.) In Scotland a nuncupative legacy of one hundred pounds
Scots (£8, 6s. 8d.) is good, but
other wills must be in writing.

Nuneaton, mrkt. tn., Warwickshire, England, 9 m. N.E. of Coventry. Some traces exist of a Benedictine nunnery founded in the time of Henry II. Manufactures ribbons, worsted goods, elastic web, and hats. Coal, ironstone, and stone are worked. Pop. (1901), including Chilvers Coton, 24.996.

Nunez de Arce, GASPAR (1834-1903), Spanish poet, was born at Valladolid; was minister for the colonies in the Sagasta cabinet (1883-4), and in 1888 took charge of commerce, agriculture, and home affairs. He was distinguished as a lyrist, and was called the 'Spanish Tennyson.'

cient walls and moat, and is one of the richest towns on the Continent in mediæval buildings and works of art. Albrecht Dürer, Veit Stoss, Peter Vischer, and Adam Kraft lived and worked here. Among the monuments are statues of Melanchthon, Hans Sachs, and the Prince Regent Luitpold (1901), and a fountain in commemoration of the first railway in Germany, opened in 1835 between Nuremberg and Fürth. The churches are full of priceless paintings, statuary, and carvings. The castle, dating from 1050, was enlarged by Frederick I. (Barbarossa), and has served as residence for many German em

Nurragghi, Nurhags, Norreches, the remarkable archaic towers of Sardinia, which are closely akin to the Corsican martello towers, the talyots of Minorca, the Scottish brochs, and similar buildings in New Mexico. They are referred to by Diodorus Siculus as Dædalic monuments, being thus associated with Dædalus, the Cretan hero. As to the purpose for which they were reared, and who were their builders, there is much diversity of opinion. Fergusson's conclusion, that the Sardinian towers were used in the same way as the Persian 'towers of silence,' might find some favour, were it



Views in Nuremberg.

1. The Castle. 2. Dürer's House. 3. Schöner Brunnen.

He published Gritos del Combate (1875), El Vertigo (1879), and La Vision de Fray Martin (1880); and his plays include Como se Empeñe un Marido (1860) and El Hazde Leña (1882). See Menendez Pelayo's Nuñez de Arce (1892).

Nunneries. See Monasticism. Nuphar, a genus of aquatic herbaceous plants belonging to the order Nymphæaceæ. They bear floating peltate leaves and large yellow flowers. The rootstock should be placed in an open wicker basket of soil and sunk under water. They like plenty of sunlight.

Nuremberg (Ger. Nurnberg), tn., Bavaria, 96 m. N.N.W. of Munich. It still retains its anperors. Of famous collections the Germanic museum is the most, valuable, and a remarkable library, dating from 1445, is preserved in the old Dominican monastery. The principal industries are the manufacture of toys, optical and other scientific instruments, cycles, automobiles, bronzes, and the brewing of beer. Nuremberg was made a free city in 1219, and retained its independence till 1803, when Napoleon I bestowed it upon the king of Bavaria. It was from the beginning a Protestantstronghold, and the gymnasium or high school was opened by Melanchthon in 1526. Pop. (1900) 261,081, See Réc's Nuremberg (1905).

not for his own statement that among two thousand nurhagsonly one skeleton has been discovered. Probably Spano's belief that they were the strongholds of a troglodyte race affords the safest generalization. See La Marmora's Nardinia, and Spano's Nuraghi (1867).

Nurses, ROYAL BRITISH ASSOCIATION OF (founded 1887), aims at the improvement of the general status of trained nurses, and at the establishment and administration of schemes of mutual help among the members. It has a membership of about three thousand trained nurses. Headquarters: 10 Orchard St., Portman Square, London.

Nursing. While it is desirable, and indeed almost imperative, that all nurses should be trained in hospitals, only a small proportion of the pupils find their permanent life-work in such institutions. Of the others, many have to take up home nursing, district nursing, or special work like insanity and midwifery. The The last two branches naturally require special training. Most of the best schools insist that a candidate for a nursing certificate should have studied for three years at least, although the whole of the period need not always be spent in the same institution. But the standards of the examining bodies should be made more uniform, or else certificates of varying grades of efficiency should be issued by a central examining body. Edinburgh Royal Infirmary may be taken as a type of the best training institutions. A nurse in this hospital must be between the years of twenty-three and thirty-five. She must be robust in health, and without defect of sight or hearing.' is required to pass an examination in elementary anatomy and physiology and in hygiene, and is also required to show that she has a knowledge of plain cooking and of housekeeping. No premium of housekeeping. No premium is required, but the candidate must enter into a three years' engagement. During the first year she receives £8, during the second £12, and during the third £20, as well as board and residence, indoor uniform laundry, throughout her training The day's duty is twelve hours, with two hours off each day. During the three years two terms of six months each are spent on night duty. Lectures are delivered and examinations are held frequently throughout the period of training. At the end of that time, should she have passed her examinations, the candidate receives a certificate and is a fully qualified nurse. Most nurses who devote themselves to private nursing find it expedient to join one of the many associations which provide their members with patients, and in some cases with residence while they are unemployed. Similar associations have been formed of male nurses. There are, however, few facilities for the training of male nurses except in asylums, whose attendants, after two years' experience and two courses of lectures, may present themselves for an examination held by the Medico-Psychological Association, which grants a certificate to those who

For monthly nursing and midwifery adequate training is provided at the various lying-in hospitals of the kingdom. A premium of about twelve and a half guineas for three months, or twenty-five guineas for six months, is usually required, and the incidental expenses are high.

The nursing of children makes perhaps the least demand upon a woman's physical strength; but, as a rule, the salaries are lower in children's hospitals, many of which demand a premium.

While all nursing must be specially adapted to the nature of a patient's illness, certain general principles apply to every case of sickness. The room must be scrupulously clean, and it should contain no superfluous furniture. It should be well ventilated, light and airy, and of a size that per-mits of a uniform temperature being maintained if necessary. When possible it should have painted walls and polished floor. Neither hangings nor valances should be about the bed, which ought to be furnished with a spring mattress below a thin hair one. The blankets should be light, and soiled linen must have no place in the sickroom. Vessels and toilet dishes must be most rigorously cleaned. Anti-septics may be employed if necessary, but thorough cleanliness is the best antiseptic. A sickroom window ought always to be open at the top both by night and by day, while as much light should he admitted as is possible without inconveniencing the patient. Spotless purity of person and of attire has a higher professional status in a nurse than has godli-The nurse's constant aim must be to keep her patient at rest in mind and body. She has to think for both. She must re-lieve the sufferer from anxiety and fear. Without abrogating her rule, she must, as best she can, by sweet reasonableness, soothe the relatives, yet avoid their fond but injudicious suggestions. The taking of careful notes of her patient's condition, records of his temperature and pulse, and faithful observation of changing and often evanescent symptoms, are among the nurse's chief duties. With regard to the patient, cleanliness is again the first of the nurse's duties. The excreta must be destroyed. The skin, nails, hair, and teeth require attention. In many cases the bladder and bowels must be relieved, and bed sores have to be guarded against.

Nusie, tn., crown land of Bohemia, Austria, a S.E. suburb of Prague. Pop., including adjacent village of Pankratz (1900), 20,440.

Nut, a hard indehiscent pericarp containing only one seed. Many nuts are foods of considerable value, containing a large proportion of oil, together with a

considerable amount of proteid material. Except in the case of chestnuts, few nuts contain any considerable amount of starch. Ground-nuts or pea-nuts are really leguminous seeds, containing about 50 per cent. of oil, and 25 per cent. of nitrogenous matter. The lazel-nut, beech-nut, and chostnut are the principal nuts found wild in Britain; but extensive use is made of imported Spanish nuts, Brazil nuts, cocoanuts, almonds, and pistachio kernels, as well as of cultivated walnuts and filberts.

Nutation, a slight 'nodding' of the earth's axis, detected by Bradley about 1727, and definitively described in 1748. It is chiefly due to an inequality in the moon's action on the earth's equatorial protuberance, and has a period of about 18'6 years prescribed by the revolution of the lunar nodes. As the result, the precessional circle described by the pole of the equator round the pole of the eliptic is a waved line comprising nearly 1,400 undulations, each with a radius of 9"21. This measures the 'constant of nutation.' Solar nutation, with a constant of 1"2, is occasioned by the annual variations in the sun's declination.



Nuteracker.

Nutcracker (Nucifraga caryocatactes), a member of the crow family (Corvidæ), which is widely spread over Europe and Asia, and is an occasional visitor to Britain. It is smaller than the jackdaw. The wings and tail are black, or greenish-black, but the rest of the body is umber-brown profusely spotted with white, except on the throat, where the spots are less numerous. The bird specially haunts pine forests, and feeds on the seeds of firs, on hazel nuts, and also on animal food. The nest is bulky, and is placed in a fir tree at a considerable distance above the ground. The eggs number two to three, and are bluish-green spotted with brown. Breeding commences in the beginning of March. In India occur two other species, N. multi-punctata in Kashmir, and N. hemispila in the Himalayas.

the more remote functions of respiration, circulation, secretion, and excretion. The metabolism of

an amoboid cell is comparatively

simple, since it derives its oxygen and food from the fluid in which it wanders free. In multicellular

plants and animals, however, the

majority of the cells are fixed.

and are differentiated for special purposes. Their fixation requires

that nutriment be brought to

them, and their specialization necessitates the elaboration of

the pabulum into an assimilable

form. In a highly organized in-dividual like man the blood and

lymph are the media which carry

oxygen and pabulum to the in-

dividual cells. The secretions of the various glands connected with the alimentary system trans-

form the food into compounds, which may be either stored up for future use, or poured directly into the blood stream. By means of the circulation these com-

pounds are brought into contact with the cells, each of which has a selective power of withdrawing from the lymph and blood ma-

terials it requires for manufac-

turing its own special product,

while it passes into the circulation the waste products of its activity. The ultimate nutrition

Nuthatch, a small passerine bird belonging to the genus Sitta. In the well-wooded parts of south and central England, as well as



Nuthatch.

over south and central Europe generally, occurs the common nuthatch (S. cæsia), but it is rare in Scotland, and absent in Ireland. The colour is slaty-blue above, there is a black streak at the side of the head, and the under surface is buff-coloured posteriorly and white in the neck region. The tail-feathers are tipped with white and gray, and the male displays these markings when exhibiting himself before the female. The nuthatch is a climbing bird, and has the first toe proportionately large and the second unusually small. The food consists of a mixture of insects and vegetable food, especially nuts when these are obtainable. The nuts are broken by strokes from the powerful bill, the blows being delivered with a peculiar swinging movement from the hip; the name nuthatch or nuthack is due to this habit. The nest is usually placed in the hole of a tree, the orifice of which is plugged with mud. The eggs are five to seven in number and are white, boldly blotched with reddish-brown. The male has reddish-brown. The male has a loud and clear call note. Another species is the Syrian nuthatoh (S. Neumayeri), which

haunts rocky districts.
Nutmeg (Myristica fragrans), an evergreen tree, with dark glossy leaves, native to the Mo-lucca Islands. It is largely cultivated in the tropics, especially in S. America and the W. Indies. for its seeds, the kernels of which constitute the nutmegs of commerce, whilst the large, branched crimson arils constitute mace. When the pericarp splits, the fruit is collected and the seeds separated. These are then dried in frames until the kernels rattle within. The shells are then cracked, and the kernels rubbed over with dry lime. The dry kernels contain about 25 per cent. of fat, known as nutmeg-butter or oil of mace, and about 3 per cent. of volatile oil of nutmeg. Nutmegs are principally used as a flavouring spice, and are added in the grated form to foods and drinks. The volatile oil is also of use in medicine as a

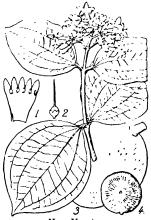
carminative.

and respiration thus take place not in the alimentary and res-piratory organs, but in the cells of the various tissues. Individual cells have but a limited power of growth in size, and up to a certain age absorption of pabulum in excess of the daily needs leads to multiplica-tion of the cells, and consequent growth of the whole organism. After adult life is reached, the

Nutmeg (Myristica fragrans). 1. Section of female flower; 2, section of male flower; 3, seed in mace (aril); 4, cross section of seed (nutmeg).

cells preserve between the receipt and the expenditure of energy that balance which constitutes maintenance. If an amount of food

in excess of the needs of an organism be digested, the surplus may be stored in adipose tissue. but it no longer leads to multipli-cation of the cells. Throughout the whole organism the cells are constantly building up one class of complex substances, which have a tendency to spontaneous decomposition and a tendency to spontaneous regeneration. Great differences of opinion exist as to the part played by the nervous system in nutrition. On the one hand, the degeneration of



Nux Vomica. 1, Corolla, opened; 2, germen; 3, ripe fruit; 4, seed.

muscles which follows section of a motor nerve may be attributed to the loss of the functional activity of the muscles. On the other hand, the paralytic secretion by glands cut off from their nervous supply cannot be due to func-tional inactivity. From the rapid development of bed sores, from various experiments in lower animals, and from the enfeeble-ment of tissues from damaged nerve supply, most physiologists incline to believe that a trophic or nutritive influence is exerted by healthy nerves.

Nux Vomica, a small tree, Strychnos Nux Vomica, belonging to the order Loganaceæ. It is a native of India, Persia, and north of Australia. The seeds yield the nux vomica of the British Pharmacopæia. They are nearly circular discs, about an nearly circular uses, inch in diameter, with a drab-coloured silky coat. They are coloured silky coat. They are extremely bitter, and, of course, very poisonous. The tincture of nux vomica is made by exhaust-ing two ounces of the finely-powdered seeds with one pint of rectified spirit. Strychnine, which pervades all parts of the plant, is a colourless, odourless, very bitter, crystalline body, and is a powerful exciter of the centre of those

nerves which are distributed to the voluntary muscles. The muscles of respiration are afficted equally with the other muscles, and during the spasms breathing is suspended. Given in very small doses, strychnine acts as a tonic to the centres

which regulate movement.
N. W. T., North-west Terri-

tories.

Nyangwe, trading centre, Congo Free State, Central Africa, on r. bk. of Congo or Lualaba, 4° 13' s. and 26° 21' E.; formed the starting point of Stanley's descent of the Congo in 1876.

Nyanza. See Albert Nyanza, and Victoria Nyanza.

Nyasa, lake, S.E. Africa, be-tween German and Portuguese E. Africa and British Central Africa. It extends 350 m. N. to S. Area, about 14,000 sq. m. Standing 1,500 ft. above sealevel, it goes down to nearly 400 fathoms. At s. end its waters issue into the Shiré.

Nyasaland, GERMAN, that part of German E. Africa adjoining Nyasa lake on N. and N.E. It includes the rich alluvial plain of Konde, with the volcanic masses to the N., culminating in Mt. Rungwe (10,400 ft.).

Nyasaland, Portuguese, E. Africa, the N. dist. of prov. Mozambique, extends from the Indian Ocean to Lake Nyasa. It embraces littoral tracts 60 to 70 m. wide; a rolling plateau (1,500 ft.), similar to the veld of S. Africa; and a highland region, well-wooded, and divided into fertile and well-watered valleys. Total annual trade, about £200,000.

Nyblæus, Johan Axel (1821), Swedish philosopher; professor of philosophy at Lund (1856-86). His chief work is Den filosofiska Forskningen i Sverige från Slutet af Adertonde århundradet (1873-86), a work of great power and

research.

Nyblom, CARL RUPERT (1832). Swedish author, born at Upsala; professor of æsthetics at Upsala (1869), and member of the Academy (1879). His first volume of poems, Dikter, appeared in 1860. In 1864 he published, under the pseudonym of 'Carlino,' Bilder från Italien, reissued in 1883 under the title of Ett Ar i Södern. In 1865 he started the literary journal, Srensk Literatur-tid-skrift. His best critical work is Estetiska Studier (1873-84). He translated Shakespeare's Sonnets and Moore's Irish Melodies.

Nyborg, tn. on E. coast of Finen, Denmark, 17 m. E.S.E. of Odense; was a fortress till 1867. Founded in 1170, it was one of the most important towns in Denmark during the middle ages. In 1659 the Swedes were defeated

here. Pop. (1901) 7,790.

Nyctaginaceæ, an order of mostly herbaceous plants bearing hermaphrodite flowers. The roots of most species act as gastro-intestinal irritants. Among the genera are Mirabilis, Abronia, and Bougainvillea.

Nyctalopia, in medicine, a disease of the eyes, characterized by an inability to see well except in strong daylight. It may occur as one of the symp-

toms in many diseases.

Nyctanthes, a genus of small Indian trees belonging to the order Oleaceæ. The only known species is N. arbor-tristis, the tree of sadness, which is some-times cultivated as a stove plant in Britain. It likes a light peaty soil containing a little charcoal. In summer it bears numerous white, salver-shaped, very fragrant flowers, which open at night and fall at sunrise.

Nycteribia, a genus of anomalous, blood-sucking flies, of whose structure and affinities but little is known. The members of the genus are wingless, and are found

on bats.

Nye, EDGAR WILSON (1850-96), American humorist, was born in Shirley, Maine; admitted to the bar in Wyoming territory (1876), and afterwards settled in New York. Under the pseudonym or Bill Nye' he wrote Bill Nye and the Boomerany (1881), The Forty Liars (1883), Baled Han Dill Nuc's Blossom Rock (1884), Bill Nue's Blossom Rock (1885), Remarks (1886), and Bill Nye's Thinks (1888).

Nyerup, Rasmus (1759-1829), Danish author, born at Nyrup in Fünen; became professor of literary history at the University of Copenhagen (1796), and principal librarian there (1778). Besides editions of old Scandinavian literature, he published Bidrag til den danske Digtekonsts Historie (1800-8), with continuations Udsigt over den danske Digtekonst under Kong Frederik v. (1819) and Bidrag til en Udsigt over den danske Digtekonst under Kong Christian VII.

Nyiregyhaza, tn., co. Sza-boles, Hungary, 17 m. s.e. of Tokay, grows wine and manufactures soda, saltpetre, and matches. Pop. (1900) 31,875.

Nykjöbing, tn., island Fal-ster, Denmark, 68 m. s.s.w. of Copenhagen; the see of the bishop of Laaland. The castle was one of the finest in Denmark. It exports bacon, and manufactures beet sugar. Pop. (1900) 7,345.

Nyköping, tn., Sweden, cap. of co. Södermanland, on Baltic, 35 m. E.N.E. of Norrköping; has cloth and machine factories and stocking-weaving, has a considerable trade in grain, and exports iron ore. Pop. (1900) 7,375.

Nyighau. See Nilgai.

Nymphæ, the nymphs, were in ancient Greek mythology female deities. They are divided into Oceanides, nymphs of the outer ocean; Nereides, nymphs of the sea (the Mediterranean); Naiades, nymphs of rivers; Oreades, nymphs of the mountains; Alseides and Napaze, nymphs of valleys and glens; Dyades or Hamadryades, nymphs of trees and also nymphs of places.



White Water-luly (Nymphae alba).

Nymphæa, a genus of aquatic plants belonging to the order Nympheaceæ. They bear showy solitary flowers, white, red, or blue in colour, with four sepals and numerous petals inserted on a fleshy disc. The leaves are large, cordate, and floating. There is only one British species, the white water-lily (N. alba), which bears large, scentless flowers in July, the flowers closing and retiring below the surface of the water at sunset. Among the species is N. Lotus, the Egyptian lotus, with large red flowers in summer. Its seeds were used by the ancient Egyptians for making bread.

Nyssa, a genus of trees belonging to the order Cornacese, known as tupelo trees. Occasionally they are grown in Britain on account of the beautiful deep red colour of the leaves in autumn. They bear small flowers, followed by oblong drupes.

Nystad, tn. and port of Abo-Björneborg prov., Finland, 62 m. N.w. of Åbo, on Gulf of Bothnia. It has shipbuilding yards, tan-neries, and manufacture of to-hacco. Here, on Aug. 30, 1791, was signed the treaty between Russia and Sweden. Birthplace of the painter Ekman (d. 1873). Pop. (1897) 3,928.

N. & Q., Notes and Queries.

O. Modern English long ō is a diphthong (Murray, oⁿ). When it was a simple vowel it probably fluctuated, as it does in most languages, between the 'narrow' and the 'wide' sounds (Murray, o and o). In a general scientific notation it may include both (mid back round). Modern English short ō, as in 'not,' is neither of these (low back wide round). In Latin and Greek O doubtless included a variety of sounds. O was a modification of O employed to distinguish one of these, perhaps 'wide' o, and not simply to mark a difference of length. It



Otk (Quercus robur). 1, Male flower; 2, female flower.

was called Omega, or great O, in contrast to the older letter Omicron, or small O, which at one time was smaller than the other letters. English o needlessly represents several other sounds for which other signs are available. Since the 15th century it has acquired the value of u (as in 'do'). To denote this sound it is generally written twice (as in 'good'). It also shares with u the representation of the sound in 'son,' love,' etc. Before r, as in 'word,' it has a sound common to all the vowels except a (cf. 'bird,' 'serve,' etc.).

The Semitic value of O is consonantal; it is a throat sound to

which there is no European parallel. We still use the early Semitic form, supplying a very clear case of connection between the form and the name, for the Semitic name ayin means 'eye.' Hebrew y is a modification of O. Oahu. See HAWAIIAN ISLANDS.

Oahu. See HAWAHAN ISLAN Oajaca. See Oaxaca.

Oak, a tree belonging to the genus Quercus, of the order Cupulifera, having a three-celled ovary and a round nut (acorn) placed in the lower part of and invested by a scaly truncated cup. The species of greatest importance is the British oak (Q. robur), found in Europe and Asia, nearly as far north as the Arctic Circle. The potential age and size of The the oak are very great. Newland oak in Gloucestershire has a circumference of forty-six feet at one foot from the ground; whilst the trunk of Thwaites's oak, recently felled in Norfolk, weighed over twenty tons. The oak of Thoresby extends its arms over 180 ft. of ground, and can give shelter to 1,000 horsemen. Oak wood is neither the hardest and heaviest nor the most supple and toughest of woods, but it combines in a useful manner the average of these qualities. The piles of Old London Bridge taken up in 1827, sound after six and a half centuries' use, are a striking instance of its lasting quali-ties; whilst the 'bog oak,' blackened by the action of the iron salts in peat-mosses, remains sound after far longer periods. The bark is largely employed in dyeing and tanning.

Oakeley, SIR HERBERT STAN-LEY (1830-1903), British composer, and from 1865-91 professor of music at Edinburgh, born at Ealing. While in Edinburgh he gave a great impetus to the study of music. Among his compositions are orchestral and choral works, the latter including a morning and evening service, anthems, students' songs, and, in honour of Queen Victoria, A Golden Reign and Dawn and Eventide, 1837-1901. He was knighted in 1876. See Life by

E. M. Oakeley (1904).

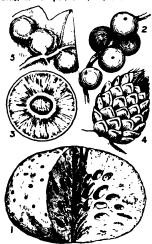
Oak-fern. See POLYPODIUM.
Oak-galls, abnormal or diseased growths produced on the oak by certain insects and fungi. The majority are due to hymenopterous insects known as Cynipidæ. The female gall-fly pierces with her ovipositor some part of the oak tree, and deposits her eggs. Swelling of the part follows, and later on the eggs are hatched, and the larvæ develop into fresh gall-flies, which repeat the life-history

of their parents. The so-called oak-apple is due to the activity of Dryoteras terminalis; whilst other forms are traceable to Biorhiza aptera (which attacks the roots), Cynips Kollari (responsible for the so-called Devonshire gall), Aphilothrix gemme (which causes the artichoke gall), and Andricus curvator (whose gall is produced on the leafstalk or midrib).

Oakham, cap. of co. Rutland, England, in the vale of Catmos, 11 m. E.S.E. of Melton Mowbray; has a ruined Norman castle. Pop.

3 293

Oakland, city, California, U.S.A., co. seat of Alameda co., 5 m. across the bay from San Francisco, of which it is a residential suburb. Industries include shipbuilding, fruit-canning, smelting, flour, cotton, and carriages. Pop. (1900) 66,960.



Cek-galls.

1. Galt of Drysterus terminutis, cut to show larval chambers. 2. Gall of Birrhiza ayters. 3. Gall of Cynips Koltari, section, with larva. 4. Gall of Aphilothrix gemmo. 5. Gall of Andricus curvetor.

Oakum, originally the coarse part of the flax when separated by hackling, but now signifying hemp fibre obtained by untwisting and picking out the yarn of old hemp rope. It is used for caulking ships' scams, dressing wounds, and for other purposes. As an employment for convicts, oakumpicking is falling into disuse.

Oamaru, N. pt. of Otago provincial dist., N.Z., 78 m. N. of Dunedin. Exports wool, grain, and frozen meat. Pop. (1901) 4,836.

O Arad, Hungary. See Arad. Oas, tn., Albay prov., Luzon, Philippines, 16 m. N.w. of Albay. Pop. (1896) 16,000.

Oases, fertile parts of an otherwise arid desert, found wherever there is a proper water supply and drainage. The water may come from outside the desert area (as in the case of the Nile, which makes the great oasis of Egypt, of which El-Khargeh, 115 m. W. of Esneh, is the capital, or it may be derived from a nat-

which implicated the Duke of York, and ultimately the queen herself, in a design to murder the king, set the Duke of York on the throne, and restore Roman Catholicism in England. Through the accusations of Oates some thirty-five men were done to death. On the accession of James II. (1685) he was imprisoned for perjury.



Species of Oats.

1. Avena orientalis. 2. A. sativa. 3. A. nuda. 4. A. strigosa. 5. A. fatua. 6. A. brevis.

ural spring, or from an artesian or other well—e.q. in Algeria.

Oates, TITUS (1649-1705), the professed discoverer of a Popish plot, was born at Oakham. Having wormed himself into the counsels of the Roman Catholics in London, and having spent some time among the Jesuits in Spain, he, in 1678, laid before Charles II. the details of a fictitious plot,

Oath. A person is bound by an oath in legal proceedings, provided it is administered in such form as such person shall declare to be binding (Oaths Act, 1838). The English method of swearing is to kiss a Bible or a Testament after the words of the oath have been read to the witness by an officer of the court. By the Oaths Act, 1888, any one is per-

mitted to swear in Scotch form by adjuration of the Deity with uplifted hand, and any one who has no religious belief, or who is conscientiously opposed to taking an oath, may 'affirm' that he will speak the truth, etc. In many cases declarations have been substituted for oaths in non-judicial proceedings, and for promissory oaths: but the oath of allegiance. the official oath, and the judicial oath are still preserved, and kings and titled personages, privy councillors, bishops, sol-diers, members of Parliament, and aliens under the Naturalization Act, are still required to take an appropriate oath. Commissioners for oaths are persons, generally solicitors, appointed by the lord chancellor to administer oaths or take affidavits in any matter (with a few exceptions) in which they are not interested either as a party or as solicitor. Justices of the peace have authority to administer oaths for many purposes. Chil-dren should not be sworn unless they appear to understand the nature of an oath. See PERJURY and AFFIDAVIT.

Oats (Arena). The origin of cultivated oats is obscure. They are grown as far north as lat. 63° 30' N. In Scotland the moist and cool summer suits them better than the climate of southern England. In France oats are rarely cultivated south of Paris, and they are scarcely known in Spain and Portugal. On the other hand, they are successfully cultivated in Bengal in lat. 25° N., and in the United Provinces. The culthe United Provinces. tivation is simple, and usually consists in one ploughing, sowing, and repeated harrowing, or one ploughing, repeated harrowing, and drilling. They may be grown after a root crop, or after clover or 'seeds.' On poor soil four bushels to the acre are usually sown, and five and six occa-sionally. When pedigree oats are used, from two and a half to three bushels will serve, if the land is good and the season early. As a horse-food oats are unrivalled, and when freed from the husk, and converted into groats or oatmeal, they constitute a most nutritious food, the basis of porridge. The best-known species of oats are A. sativa, or common oats; A. orientalis, or Tartarian oats; A. brevis, or short oats; A. nuda, or naked oats; and A. strigosu, or bristle-pointed oats. To these may be added the troublesome weed A. fatua, or wild oats.

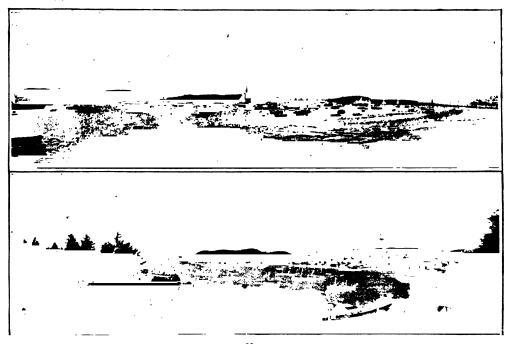
Oaxaca state, S. Mexico, 238 m. from Puebla; with sugar mills, breweries, and fibre factories. Near the city stood Uaxyaca, the ancient capital of the Zapotecos. Pop. (1900) 35,052.

Ob., abbreviation for the Latin objit, 'died.'

Ob, or OBI, riv. of W. Siberia, flowing into the Gulf of Ob, and draining about 1,300,000 sq. m. The main river, which has a length of 2,500 m., rises in the Altai Mts. At its junction with the Irtish it forms many islands, and thence to the sea it flows in two channels, the Great and Little Ob. The Ob and its tributaries are navigable by steamers for over 1,700 m.

Obadiah ('servant of the Lord'), the name of one of the minor prophets, about whom nothing is known. His prophecy consists (1) of a denunciation isted as a prophecy against Edom for its conduct on the occasion of an invasion of Jerusalem, like that recorded in 2 Chron. 21:16, 17; Jeremiah embodied such elements of this as suited his purpose in his larger prophecy; and a later prophet incorporated the early book into Obadiah as we now possess it, and added some features taken from the overthrow of Jerusalem in 586 s.c.

Oban, seapt. and wat.-pl., Argyllshire, Scotland, 20 m. w.N.w. of Inveraray, at the head of a beautiful bay, which is much frequented during the summer by yachts and steamers. Oban forms the tourist headObeid, EL. See EL OBEID.
Obeilsk, a four-sided monolith.
Quarried from the red granite of
Syene (Upper Egypt), inscribed
with commemorative hieroglyphics, placed in pairs at temple
entrances, they are reproduced
in Solomon's Boaz and Jachin,
twin towers of Gothic churches,
Greek stelæ, and Roman columns. (See Weisse's The Obelisk
and Freemusonry, 1880.) Of
ancient famous obelisks about
thirty exist, twelve at Rome, two
(Cleopatra's Needles) at London
(1578) and New York (1880) respectively. The Paris obelisk,
whose companion still stands at
Luxor, dates from the time of



Oban.
1. The bay-regatta day. 2. The town, from Pulpit Hill. (Photos by M'Isaac & Riddle.)

of Edom; (2) of a promise that united Israel shall be restored, and the kingdom shall be the Lord's. The question of the date of the book depends on two considerations—whether the destruction of Jerusalem referred to is that by Nebuchadnezzar (586 n.c.), or is some earlier event; and what is the relation of the book to Jer. 49:7-22. Either Jeremiah borrowed from Obadiah in its present form (in which case, since Jer. 49:7-22 is before the invasion by Nebuchadnezzar, Obadiah refers to some earlier invasion), or both have borrowed from an earlier prophet. Probably the nucleus of Obadiah ex-

quarters of the West Highlands. Among the antiquities are the ruins of Dunolly and Dunstaffnage castles. Pop. (1901) 5,427.

Obeah, OBEEYAH, OBIA, and OBI, is the name given by the negroes of W. Africa and of the West Indies to the sorcery practised by their witch-doctors, and also applied to the charms or fetishes used in that sorcery. See JUJU and VOODOOISM, and Edwards's British West Indies (1819).

O Becse, vil., prov. Bacs-Bodrog, Hungary, on the r. bk. of the Theiss, 50 m. s. of Szegedin. Has a trade in grain and fruit. Pop. (1900) 18.851.

Ramescs II. The highest, at Karnak (974 ft.), dates from 1600 B.C., the smallest (2 ft. 1½ in.) and oldest, found at Memphis by Lepsius (1842), from 3000 B.C. The Washington monument (1885), of marble (555 ft.), is the latest and largest specimen. See Birch's Notes upon Obelisks (1853), Parker's The Twelve Egyptian Obelisks (at Rome) (1879), and Gorringe's Egyptian Obelisks (1885).

Oberalp Pass. This pass (6,733 ft.) leads from Andermatt, above Goeschenen, in the Swiss valley of the Reuss, canton of Uri, at the N. mouth of the St. Gothard tunnel, to Disentis, in the

Vorder-Rhine valley, and so down to Coire. It forms, with the Furka, the great carriage route from Zermatt and the Simplon

to the Engadine.

Ober-Ammergau, vil., Upper Bavaria, 31 m. s.s.w. of Munich; famed for its Passion Play, which originated in 1634, and takes place every tenth year. The performances, which until quite recently took place in the open air, last from seven to cight hours. Wood and ivery carvings are produced. Pop. (1900) 1,559. See Passion Play.

Oberhausen, tn., Rhine prov., is the centre of a mining district, and has foundries, chemical works, and porcelain and glass factories. Pop. (1905) 52,096.

Oberlahnstein, tn. in Hesse-Nassau prov., Prussia, on l. bk., of Lahn, at its confluence with the Rhine, 4 m. S.S.E. of Koblenz; has two castles, and a chapel which was the scene of the deposition of King Wenceslaus (1400). Pop. 7,969.

Oberland. See BERN.

Oberstein, tn., grand-duchy of Oldenburg, Germany. A church, cut into the rock, and dating from the 12th century, was renovated in 1482. Manufactures jewellery, principally of gold and agate

nniepally of gold and agate ornaments. Pop. (1900) 7,83%.

Obesity, an abnormal development of fat, tending to accumulate most deeply in the buttocks, thighs, neck, and abdomen, both in the walls and the folds of the peritoneum, also about the heart, liver, and kidneys. It is the result of the food being either excessive in quantity as a whole, or in quantities of certain constituents, relative to the oxidizing powers of the consumer. Fat is physiologically natural to infants, and tends to accumulate on females after the climaeteric, and on males after middle life. Obesity points to a deficiency in metabolism, which prevents the excretion of unwholesome waste products, and so tends to illhealth. It is frequent in certain diseases—c.g. anæmia and in some forms of insanity. The treatment must be suited to each

- Trever

Oboc.

cutensdorf, tn., Austria,
a, at south foot of the be carefully r

Oberleutensdorf, tn., Austria, Bohemia, at south foot of the Erzgebirge, 6 m. N.w. of Brüx. Has lignite mines, and manufactures furniture, cottons, toys, and cloth. Pop. (1900) 12,928.

and cloth. Pop. (1900) 12,928.

Oberlin, tn., Lorain co., Ohio,
U.S.A., 34 in. w.s.w. of Cleveland; is the seat of Oberlin College (1833). Pop. (1900) 4,082.

Oberlin, Johann Friedrick (1740-1826), Protestant pastor in the Ban-de-la-Roche, was born at Strassburg. He was a warm advocate of education, founding the first infant schools. He also interested himself in agriculture. His collected writings were published in 1843. See Butler's Life of J. F. Oberlin (1882), and Stein's J. F. Oberlin (1899).

Oberon, king of the fairies,

Oberon, king of the fairies, plays, under the names of Alberon or Auberon (Fr.) and Alberoth (Ger.), an important part in the fairy lore of the middle ages. In England he is introduced by Chaucer and Spenser, and with his queen, Titania, does much to mould events in Shakespeare's Midsummer Night's Dream. In more modern times he has been the subject of a poem by Wieland (1780), which formed the libretto of Weber's opera Oberon (1826).

Oberonia, a genus of tropical epiphytal orchids, mostly natives of Asia and Australia, bearing crowded spikes or racemes of rather small flowers. The flowers of all the species mimic insects or other animal forms,

case, but diet and exercise must be carefully regulated. An important point is the avoidance of too rapid reduction of fat. What one should aim at is the steady loss of a very few ounces in the week, the amount of reduction being regulated by the age, weight, and general health. Sugars, starches (e.g. flour), and fats must in most cases all be reduced, though in consequence it may be necessary to increase proteids, such as lean meat. The Banting system consisted largely in avoiding fat, sugar, and starches; while the Salisbury treatment, lately in favour, practically limits the patient to lean meat and hot water, both in large quantities. Tea, if taken in any quantity, has a considerable effect in keeping down a tendency to obesity.
Obl River. See OB.

Obl River. See OB.
Obiter Dictum, a remark
made by a judge by the way'—
i.e. a remark which is not material to the determination of the
case before him. Such remarks
have no legal authority, though
they may be quoted as the
opinions of an expert.
Objectivity. See SUBJECT.
Objectivity.

Objectivity. See SUBJECT.
Oblates, a congregation of priests in the Roman Catholic Church, founded by St. Charles Borromeo in 1578, and introduced into England by Cardinal Manning in 1857. They are 'secular' priests, though living in community, and are not bound by monastic vows. The oblates of Mary Immaculate, founded by Charles

Eugène de Mazenod, bishop of Marseilles, in 1815, have about

seventy houses.

Obligation. In jurisprudence obligations are duties which correspond to private rights. Obligations arose out of mutual consent or ex contractu, or on account of injuries or ex delicto. The mere fact of occupying a certain position, such as that of an heir or a trustee, gave rise to obligations without any mutual consent; while certain actions which were not properly wrongs might lead to injuries to another, and hence gave rise to obligations.

Oboe, or HAUTBOIS, a treble, wood-wind, double-reed, musical instrument, the prototypes of which can be traced to a very remote period. It is now the most complicated of all reed instruments. The oboe is essentially an octave instrument like the flute, and has its music always written in the G clef. Its lowest note is Bb below the stave, and, including all senitones, it has a normal compassof two octaves and a fifth. The orchestral oboe is set in C, but a Bb instrument is occasionally used in military bands.

Obok, or Obock, on the Red Sea, opposite Aden, part of the French Somali Coast protectorate. The seaport of Obok, acquired by France in 1855, has since 1896 been superseded by Jibuti.

Obolus, an ancient Greek coin, made of an alloy of silver and copper, in value equal to the sixth part of a drachma, and hence to between 14d. and 14d. in English money. As the price demanded by Charon, the ferryman of Hades, for ferrying the soul across the river Styx, an obolus was placed in the

an obolus was placed in the mouth of the dead.

Oboyan, tn. of Kursk gov., Central Russia, 36 m. s.s.e. of Kursk city. Tanneries, oil works, and manufactures of wax and

tallow. Pop. 11,872.
O'Brien, James Francis
Xavier (1831-1905), Irish Nationalist politician. For taking part
in a Fenian riot in 1867, he was
tried for treason-felony, and condemned to death. The sentence
was, however, commuted to penal
servitude for life, and, some
years later, Mr. O'Brien was released under an amnesty. He
was elected to the House of Commons for South Mayo (1885), but
was returned for Cork city at
the by-election (1895). He was
a strenuous opponent of Mr.
Parnell's retention of the leaflership after the revelations in the
O'Brien was for many years
honorary treasurer to the Irish
National League of Great Britain,
and general secretary to the
United Irish League,

O'Brien, Lucius Richard (1832), Canadian painter, native of Ontario. From its foundation in 1880 till 1890 he was president of the Royal Canadian Academy of Arts. Many of his drawings were sembodied in *Picturesque* Canada (1884), and some of his pictures are at Windsor. Sunrise on the Saguenay at Ottawa is one

of his chief works.
O'Brien, WILLIAM (1852),
Irish journalist and parliamentary leader. He began life as a newspaper reporter, first on the Cork Daily Herald, and subsequently on the Freeman's Jour-nal. In 1880 he founded United Ireland as the organ of the Land League and the Parnellite party, and became its editor. Since 1883, except for the five years, 1895-1900, when he retired owing to the internal dissensions of the Irish party, Mr. O'Brien has represented the Nationalists in Parliament. His active prosecution of the policy and methods of the National League, the Plan of Campaign, and the Tenants' Defence League resulted in his frequent imprisonment under the Crimes Act (1887-91). When he was summoned to appear at Tipperary on a political charge in September 1890, Mr. O'Brien escaped, with Mr. John Dillon, to Cherbourg, and thence to the United States, but returned to Ireland the following year. In the leadership controversies he at first sided with Mr. Parnell. but finally threw in his lot with the Anti-Parnellites. He founded the United Irish League in 1898, and, as its newspaper advocate, The Irish People; and in 1902-3 he took part in the conferences between members of the Nationalist party and representatives of the landlords. He has published When We were Boys (1890), Irish Ideas (1894), A Queen of Men (1897), and Recollections (1905).

O'Brien, WILLIAM SMITH (1803-64), Irish Nationalist, and head of the Young Ireland party, was born at Dromoland, Co. Clare. He was returned to Parliament for Ennis (1828), and for Limerick (1835). Opposed to O'Connell on many points, he vet worked with him for the repeal of the union from 1844-6; in the latter year, however, he seconded, and founded the Irish confederation in 1847. In 1848 a band of peasants which he led, with James Stephens, afterwards the Fenian 'head-centre,' as his lieutenant, was defeated by the police, and he himself captured and condemned to death. sentence was commuted to transportation, but in 1856 a full pardon enabled him to return to Ireland. In 1856 appeared his Principles of Government, or Meditations in Exile.

Obscene Works, Publications, etc. In England it is a misdemeanour punishable with tine and imprisonment to publish obscene or immoral books or pictures, or to obtain and procure such books or pictures for the purpose of uttering or selling them. The test of obscenity is whether the tendency of the matter charged as obscenity is to deprave and corrupt those whose minds are open to such immoral influences. Any one who has reasonable cause to believe that obscene books or pictures are kept in some place for sale or exhibition may make a complaint upon oath to two justices or a metropolitan police magistrate, who may issue a search-warrant under which such books, etc., may be seized and brought into court. If the court is satisfied that the books, etc., are of such a character that it would be a misdemeanour to sell or publish them, they must be ordered to be destroyed. Persons may also be prosecuted under the Vagrancy Act as rogues and vagabonds who expose or exhibit indecent pictures, prints, etc. By the Post Office Act, 1870, the post-By the master-general may, with the approval of the Treasury, make regulations for preventing the sending or delivery by post of indecent or obscene prints, pictures, books, cards, or other postal matter; and by the Post Office (Protection) Act, 1884, it is a misdemeanour punishable with fine and imprisonment to send indecent prints, books, etc., by post. The affixing or exhibiting indecent advertisements is punishable under the Indecent Advertisements Act, 18 9. In Scotland, in addition to the acts above referred to which apply to Scotland, the Burgh Police Act, 1892, s. 380, makes it an offence punishable with a fine of £10 or imprisonment to publish, exhibit, or offer for sale obscene pictures, books, etc., or to exhibit disgusting or obscene objects, or to sing or recite in public any obscene song or ballad.

Obscurants, or Obscurant-ISTS, the term applied to the opponents, on the grounds of religious prejudice, of the advance of education and liberty

of thought.

Observatory, a scientific establishment for observing, primarily, the heavenly bodies; secondarily, magnetic and meteorological phenomena. Astronomical.—The earliest official foundation of the sort was at Alexandria in the 3rd century B.C.; and mediæval astronomy culminated in the erection of observatories at Nuremberg by Bernhard Walther (1472), at Kassel by the Landgrave William IV. (1561), and at Hveen by Tycho Brahé (1576). The commencement of the modern epoch was marked by the foundation of the observatories of Paris and Greenwich in 1667 and 1675 respectively. Four royal observa-tories exist in the British dominions—at Greenwich, the Cape of Good Hope, Edinburgh, and Dublin. The original function of the first was to promote the interests of navigators. A magnetic and meteorological department was added in 1838; and from 1873 photographic records of the solar surface have been regularly secured. The Cape Observatory, completed in 1829, had the scope of its work widened in 1898 to include astrophysics. The Scottish Royal Observatory, erected on the Calton Hill (1818), was transferred to new buildings on Blackford Hill (1896). It has been since 1834 directed by the Astronomer-Royal for Scotland. The fourth royal observatory was erected at Dunsink in 1785 by the University of Dublin. Oxford possesses the Radcliffe Observatory (founded 1771), and the University Observatory (1875), directed by the Savilian professor of astronomy. The Cambridge University Observatory was established in 1820. The The Cammost important French observatories, besides that of Paris, with its astrophysical dependency at Meudon, are those on the Mont Gros near Nice, of Marseilles, Toulouse, Bordeaux, Lyons, and Algiers. The foundation of the Algiers. The foundation of the Berlin Observatory about 1700 was due to Leibniz; that of Königsberg was distinguished by the labours of Bessel; but the astrophysical observatories of Potsdam (1874) and Königstuhl (1899) are now pre-eminent. The Imperial Observatory of Vienna dates from 1756, and was transferred to new buildings on the Türkenschanze in 1880. observatory of Pulkowa, near St. Petersburg, began its activity under Struve in 1839; and there are other Russian observatories at Moscow, Tashkend, and Kasan. Rome has observatories on the Capitol and at the Vatican; Milan owns the Brera, founded in 1763; and the observatory of Catania is duplicated on Mount Etna, at an elevation of 9,600 ft. The chief establishments in Sweden are at Stockholm, Lund, and Upsala; and those at Hel-singfors and Abo in Finland derive special importance from their high latitudes.

The foundation in 1843 of the Cincinnati Observatory initiated astronomical research in the United States; the effective activity of the Naval Observatory, Washington, began in 1845, and that of the Harvard College Observatory in 1847. It has been extended to comprehend the southern hemisphere by Professor Pickering's establishment of a post at Arequipa, where surveying operations, photometric, photographic, and spectrographic, are carried on in conjunction with those executed at Harvard. The Yerkes Observatory, inaugurated Oct. 21, 1897, at Williams Bay, Wisconsin, holds, however, the primacy for splendour of equipment. It has an outpost for solar research installed since 1904 on Mount Wilson, California, at an altitude of 5,900 ft. The Lick Observatory on Mount Hamilton (4,200 ft.), in the same state, was completed in 1888. The Allegheny Obser-vatory, founded in 1859, was reconstructed in 1899. An astro-physical observatory, in connection with the Smithsonian Institution of Washington, was crected in 1890. The Halsted Observatory, New Jersey, possesses a 23-inch refractor; that of Yale University, a 7-inch meliometer. Professor Lowell's at Flagstaff, Arizona (7,300 ft.), was organized in 1894; and other fine institutions are the Leander M'Cormick, Virginia; the Chamberlin, Colorado; the Flower, Pennsylvania; the Goodsell, Minnesota; the Washburn and Dearborn, in Wisconsin and Illinois respectively.

In S. America, the national observatory of the Argentine Republic was founded by Gould in 1871; and there are official establishments at Buenos Ayres, Monte Video, Rio Janeiro, and Valparaiso. Australia has observatories at Melbourne, Sydney, and Perth, besides Mr. Tebbutt's at Windsor, New South Wales. The central meteorological observatory of the United Kingdom was founded at Kew in 1842.

was founded at Kew in 1842.

Meteorological.—In Britain all instruments intended for scientific purposes are compared with the standards at Kew. The majority of central institutions or meteorological stations of the first order are provided with ingenious self-registering instruments which record continuously the variations in the meteorological elements, such as pressure, tem-perature, wind, rainfall, etc., either by means of photography or by some mechanical method. In addition, eye observations are taken several times a day, to act as a control on the automatic methods of registration. The number of these observatories in the British Isles is eight-riz. Kew, Greenwich, Falmouth, Oxford, Stonyhurst, Armagh, Valencia, and Glasgow. The oldest summit station where first-class work has been carried on is the observatory on Mount Washington, established in 1870, the highest

of the White Mts. in New Hampshire (6,280 ft.). Pike's Peak, Colorado, was built in 1873, its elevation above the sea being 14,134 ft., the greatest height at which observations have been taken all the year round. Temporary observations have been made at higher altitudes, as at the cabin of M. Vallot on Mont Blanc (14,400 ft.), and at M. Janssen's station on the summit of that mountain (15,780 ft.). These heights are, however, eclipsed by the station maintained by the Harvard College Observatory upon El Misti in Peru, at an altitude of 19,000 ft., where a delicate combination of self-recording instruments has been constructed to operate dur-ing three months without attention. Other high-level stations have been maintained at great expense on the Puy de Dome, Sonnblick, Wendelstein, Santes, the Rigi, Mount Etna, and other places in Europe. At Blue Hill Observatory, near Boston, much excellent work has been done, notably in the realm of aerial investigations, and in the scientific exploration of the upper air by means of kites. See A. L. Rotch's articles on the 'Mountain Meteorological Stations of Europe and the United States,' in the American Meteorological Journal (1891 and 1892). See also The Metcorology of Ben Nevis, forming vol. xxxiv. of the Trans. of the Roy. Soc. of Edinburgh.

Observer, The, the oldest

extant, dates Early in the Sunday paper back to 1791. 19th century it was acquired by William Clement, the proprietor of Bell's Life in London, who made it what it is now-a successful seventh-day newspaper. After Clement's death the Observer was secured by Julius Beer, and under the editorship of H. D. Traill much of its former status was regained. Frederick Beer inherited the property (1880), and undertook the editorship (1894), being succeeded after his death by his wife. Since 1880 one of the features of the Observer has been the 'From parliamentary sketches, the Cross Benches, written by Mr. H. W. Lucy, Toby of Punch. In 1905 the paper passed into the hands of Messrs. Harmsworth. **Obsidian.** When perfectly

Obsidian. When perfectly molten igneous rocks are suddenly cooled, either by being ejected as lava flows or by coming in contact with the walls of fissures, they do not crystallize, but solidify in a glassy state as obsidian. Any igneous rock may be obtained in this condition by fusion in the laboratory. Obsidian is nearly as hard as steel, gray, black, or brownish in colour, and has a perfectly con-

choidal fracture, with a shining vitreous lustre. It is common in Iceland, Lipari Isles, Teneriffe, Mexico, and New Zealand, and has been largely used by primitive races for the manufacture of arrowheads, lances, and knives.

arrowheads, lances, and knives.

Obstetrics is that branch of
medicine dealing with the birth of
the child. Chloroform is a great
boon to the obstetrician and his
patient. It is often unnecessary,
but the knowledge that it is at
hand, and can be safely used
when needed, robs childbirth of
more than half its anxieties.
Another feature in the advance
of modern obstetrics is the improvement in the instruments
employed. The use of antiseptics is the third great factor in
modern obstetrics. See MIDWIPERY, PREGNANCY, and ABORTION.

Ocampo, FLORIAN DE (1499-1555), Spanish historian, born at Zamora, in Leon, was the official historiographer of Charles v.; he planned a history of Spain (Cronica general de España), beginning at the Deluge, which he only carried to the time of the second Punic w ir, and published at Zamora in 1541. The work was continued by Morales.

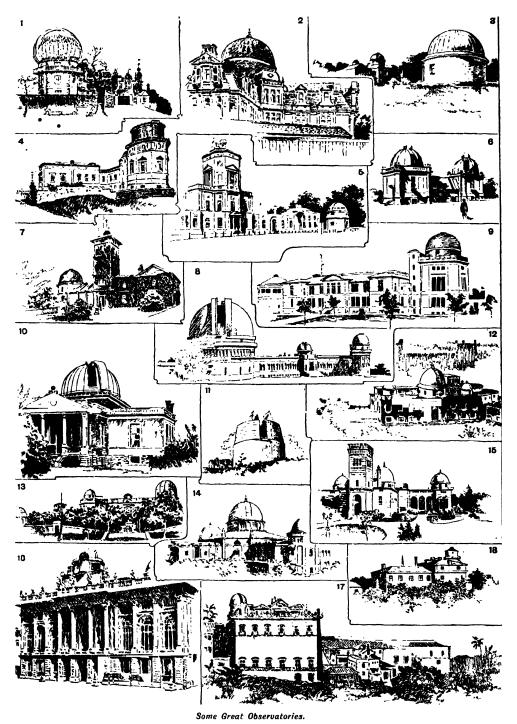
Ocaña. (1.) Town, Toledo prov., Spain, 7 m. s.s.e. of Aranjuez; has ruined walls and castle.

Ocaña. (1.) Town, Toledo prov., Spain, 7 m. s.s. E. of Aranjuez; has ruined walls and castle. Manufactures leather, pottery, and soap. Pop. 6,616. (2.) Town, dep. Santander, Colombia; has trade in cocoa and coffee. Pop.

O'Carolan, TORLOGH (1670-1738), Irish bard, a native of Meath; became blind in his youth, and became a wandering musician and poet. A number of his pieces appeared in Bunting's collections of Ancient Music of Ireland (1796, 1809, and 1840), and in Terence Carolan's Collection of O'Carolan's Compositions (2nd ed. 1780).

Occleve, or Hoccleve, Thomas (c. 1370-c. 1450), English poet, obtained a clerkship in the Privy Seal office, where he worked for some thirty-five years. His chief poem, De Regimine Principum, written in 1411 or 1412, is a moral treatise compounded out of a Latin work of the same name by Ægidius Romanus (c. 1280). He wrote also numerous minor poems, one of which, Moder of God, was long attributed to Chaucer. Some of his shorter poems were edited by Dr. F. J. Furnivall for the Early English Text Society in 1892, and his De Regimine Principum in 1897.

Occlusion is the power possessed by solids of absorbing gases, first observed by Deville and Troost. It depends largely on the area of the surface exposed, and varies with the kind of solid and gas. Thus, one volume of freshly-ignited boxwood charcoal will absorb 90



Greenwich, Old Buildings and Great Equatorial.
 Greenwich, New Buildings.
 Dunsink, Dublin.
 Edinburgh.
 Oxford, Radeliffe Observatory.
 Sydney.
 Yerkes.
 Werkeshington, U.S. Naval Observatory.
 Cincinnati.
 Lowell.
 Berlin.
 Faria.
 Vienna.
 Forbdam.
 Thin.
 IT. Livell.
 Stockholm.

volumes of ammonia, 10 of oxygen, and 14 of hydrogen—platinum black taking up 250 times its volume of oxygen. Gases thus occluded are brought into very intimate contact, so that chemical actions will go on which would not take place on mere admixture: for example, oxygen and hydrogen, when occluded by platinum, combine, and make the platinum incandescent, a principle made use of in Döbereiner's lamp; while the occlusion of noxious gases by charcoal is employed in disinfection. In general, occlusion appears to be of the nature of a molecular attraction, though in some cases, atallevents, a definite chemical compound seems to be formed; thus, in absorbing hydrogen, palladium appears to form the compound Pd₂H, although it can take in hydrogen in excess of the proportion thus required.

portion thus required.

Occultation, the temporary concealment of a star or a planet by the interposition of the moon or another planet. The maximum latitude of stars that can be occulted by the moon is 6° 39′ 55". Observations of these phenomena are highly important for the correction of lunar theory, and, when made at places remote from one another, afford accurate measures of their differ-ences in longitude. Satellites are said to be occulted when they pass behind the globe of their primary, but eclipsed when they enter its shadow. The 'circle of perpetual occultation' is a small circle of the sphere drawn round the lower pole with a radius equal to its depression. Stars rise. It is equal and opposite to the 'circle of perpetual appari-

Ocean, a British first-class battleship launched in 1898; displacement, 12,950 tons. This name came into the navy with the French Ocean, captured at the battle of Lagos Bay (1759).
Ocean and Oceanography.

Ocean and Oceanography. The ocean is the continuous body of water which covers 72 per cent. (five-sevenths) of the earth's surface (about 142,000,000 sq. m.) to an average depth of about 11,500 ft., the greatest depth, off the island of Guam, being 31,614 ft. (Compare the land average height, 2,300 ft.; greatest height, 29,000 ft.) The volume of water in this space is estimated at 300,000,000 cub. m. Sir John Murray estimates the areas covered by water of different depths as shown in Table A.

Ocean Basins.—Although the surface of the ocean waters is continuous, the islands rising above it divide it into three greater areas or basins—the Pacific, the Atlantic, and the

Indian. Table B summarizes the chief dimensions of these basins. The distribution of depths in each of these basins is estimated as shown in Table C.

TABLE A.						
Fathoms.	Area. Sq. geog. m.					
0-100 100-1,000 1,000-2,000 2,000-3,000 Over 3,000		7 10 21 55 7				
Totals	103,000,000	100				

Ocean Waters: General Physical Conditions.—Ocean waters are normally bluish in colour, brackish (e.g. in the Yellow Sea), or the sea may be tinted by the presence of innumerable minute organisms (c.g. the Red Sea), or even ren-dered phosphorescent by them. In addition to the hydrogen and oxygen of water and the oxygen and nitrogen of air contained in the ocean, some thirty other chemical elements are found, the majority in minute quantities. The soluble salts, however, make up some 35 parts in every 1,000. Table D shows the proportions of the more important elements in an average sample of sea water. This should be compared with the analysis of the salts of river water. (See RIVER.) Chlorides predominate in sea water, carbonates in river water. It is not enough, then, to assume that the constant evaporation of pure water, and the constant addition

TABLE B.

	Area. Mil. sq. m. (Wagner.)*	Mean depth. Feet. (Wag- ner.)†	Max. depth. Feet.	Rough const- line, Miles, (Penck)	Mean dis- tance, in miles, from mainland. (De Windt.)	Max. dis- tance, in miles, from mainland. (De Windt.)
Pacific Atlantic. Indian	67·70 40·00 28·65	13,450 12,450 11,800	31,614 28,320 20,600	49,000 90,000 25,000	386 376	1,408 1,056 1,274

^{*} These figures are calculated for the areas north of South Polar Circle. † Exclusive of marginal seas.

TABLE C.

	Percentage of Surface at various depths (after Penck).							
Depths in Metres.	Atlan- tic.*	Indian.	Pacific.	Whole Ocean,	Open Ocean.	Marginal Seas.		
0-200	11.5	4.6	5.4	7:1	3'5	36.3		
200-500	3.9	1.9	1.4	2.5	10	12.5		
500-1,000	4.4	1.9	1.7	2.6	1'5	10.8		
1,000-2,000	7.6	3.9	3.2	4.8	3.5	17.5		
2,000-3,000	9.6	13.5	7.9	9.6	9.1	13.4		
3,000-4,000	17.8	23.4	21.5	20.8	22:3	8.7		
4,000-5,000	23.7	35.5	37.7	33.0	37.0	0.8		
5,000-6,000	17.1	15.3	17.9	17.1	19.2	0.3		
6,000-7,000	3.4		2·2	2.1	2.4	0.0		
Over 7,000	1.0		9.8	0.7	0.8			
Mean depths in					00			
metres	3,290	3,590	3,870	3,650	3,950	1,100		
				1				

^{*} To Antarctic Circle. † To Antarctic Circle, including Andaman Sea.

‡ To Antarctic Circle, excluding Andaman Sea.

TABLE D.

Chlorides—{Chloride of sodium26 Chloride of magnesium 3 Chloride of potassium 6	$3.93 \cdot 30.7 = 89.5$ per cent. of total salts.
Sulphates— Sulphate of magnesium. Sulphate of calcium. Sulphate of calcium.	$\begin{bmatrix} 2 \cdot 2 \\ 1 \cdot 3 \end{bmatrix}$ 3:5 = 10·3

34.3

in taste, heavier than pure water, and less easily heated and cooled. The colour of sea water varies greatly. Where particles in suspension are abundant, the waters may appear to have their colour

of river water with salts in solution, explain the salinity of the ocean.

The specific gravity and density of sea water are, owing to these salts, greater than those of pure

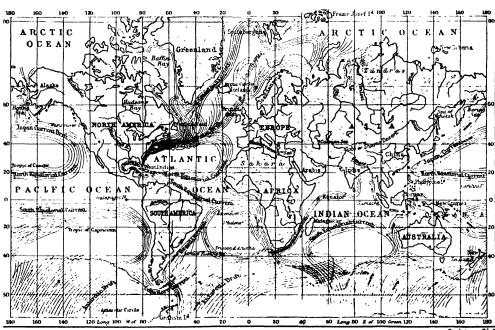
water, the mean value being 1'028 when pure water is counted 1. A. column of sea water 31 ft. 11 in. long produces a pressure of an atmosphere (pure water column, 33 ft.). At great depths, other conditions being similar, the density is a little greater than at the surface, owing to the slight compressibility of sea water. If this compression could be removed, according to Tait's investigations, the level of the ocean would rise some 115 ft. Density is also affected by temperature, and is greatest between 22.5° and 25.5° r. For details of physical methods of determining density, see HYDROMETER.

The specific heat of oceanic

than 20 per cent. has a temperature over, 40° F. The surface temperatures diminish from over 80° F. near the equator to below freezing-point near the polar cir-cles. The isotherms are bent polewards in the east of the oceans in tropical and in the west of the oceans in higher temperate latitudes, and equatorwards in the west of the oceans in tropical and east of the oceans in high temperature latitudes. This is a natural consequence of the direction of the prevailing winds, and shows that they move the surface waters in directions normal to their own. The surface conditions continue for from 300 to 400 ft..

rate of evaporation, and the supply of fresh water by rain or rivers or ice, are the factors determining the salinity of the surface waters. Those of the rainy regions round the equator are less salt (about 1.035) than those of the almost as warm but relatively cloudless and dry trade-wind areas (above 1'037), on the polar side of which the salinity gradually diminishes. Enclosed seas in warm regions receiving little rain or river water have even higher salinities than the trade-wind areas (e.g. Mediterranean, 1°0395); while such as receive many rivers, even if the rainfall is low, have much lower salinities (e.g. Baltic).

Distribution of Density.—Den-



The great Ocean Currents of the World.

waters is high, but not so great as that of pure water. The specific heat of water of specific density 1 027 is 0 93, pure water being unity. It takes as much heat to warm 1 c.m. of sea water 1° C. as to warm 3,100 c.m. of air.

Distribution of Temperature. Table E summarizes Sir John Murray's investigations into the distribution of mean temperatures in the ocean. The salient points brought out are that only 16 per cent. of the surface waters, but as much as 92 per cent. of the bottom waters, have a mean temperature under 40° F. Murray calculates that over 80 per cent. of the water has a temperature under, and less

but from about 500 to 2,500 ft. very sudden changes in temperature conditions occur. The sea is much warmer in the tropical regions than either round the equator or in the still colder regions farther north. This is to be explained by upwelling of colder water from below at the equator, and of sinking of dense warm water round the tropics. Table F, from Schott (Valdivia Reports), illustrates this clearly. Below 2,500 ft. the vertical fall of temperature is very slow, and the horizontal variations are very small, indicating probably a slow horizontal movement of the

Distribution of Salinity. - The

sity is the chief factor determining movement of water in parts of the ocean beyond the influence of factors acting on its surface, The surface equatorial waters are less dense (under 1'027) than those of the tropical areas (over 1027), and thence the density diminishes towards the poles, being less than 1025 within the polar circles.

Circulation of Ocean. - The surface currents are undoubtedly caused by the prevailing winds, and they move, like the winds, round the areas of high pressure. clockwise in the northern.counterclockwise in the southern hemisphere. Between the two westerly currents of the equatorial regions a counter-current moves castwards. In the north Indian Ocean, however, the monsoon changes modify the circulation, which is, on the whole, easterly or westerly according as the southcontained in sealed bottles, thrown overboard at sea, and picked up on the beach or by other ships; hence the name 'bottle charts.' For the peculiarities of the surface currents

TABLE E.

			1		Botton	1.		
Tempera-	Surfac	re.	Under 10	0 fms.	Over 100	fms.	Total.	
tures (F.).	Area, 1,000 sq. m.	Per cent.	Area, 1,000 sq. m.	Per cent.	Area, 1,000 8q. m.	Per cent.	Area, 1,000 8q. m.	Per cent.
Over 80°	30,100	21.9	290	2.9				i
70 -80°	38,200	27.8	1,670	16.5				::
60'-70'	18,800	13.7	2,100	20.8	300	0.5	4,360	3.2
50'-60'	13,400	9.8	1,210	12.0	1,500	1.5	2,710	2.0
40 - 50	14,900	10.9	870	8.6	2,600	2.0	3,470	2.5
35° 40° 30° 35°	11,400	10.5	1,060 1,460	10·5 14·5	66,000 54,300	51.9 42.7	67,060 55,760	48.9 40.6
Under 30°	7,400	54	1,440	14.3	2,400	1.9	3,840	2.8
Totals.	137,200		10,100		127,100		137,200	

TABLE F.

	Depths of Isothermobaths, in metres.					
	20° c.	15° c.	10° c.	5° c.	3° c.	
Atlantic, 20° 30° N	190 65 145 130 170	510 135 250 190 330	790 315 470 440 670	670 880	3,130 2,560 1,520 1,930 1,780	

TABLE G.

Deposits,		Percentage.	Depths.	Areas.	
are printing.	Limy Remains.	Siliceous Remains.	Inorganie.	Fort.	1,000,000 sq. m.
Polagie – Red clay Radiolarian ooze Diatom ooze . Globigerina ooze Pteropod ooze .	7 4 23 64 79	2 54 41 2 3	91 42 36 34 18	13,500-23,500 14,000-27,000 3,600-12,000 2,400-18,000 2,400-9,600 Total	51.5 2.3 11.0 49.5 0.4
Continental — Blue mud Red mud Green mud Green sand Volcanic ooze . Volcanic sand . Coral ooze Coral sand	13 32 25 50 20 29 86 87	3 1 14 8 2 1 1 5	84 67 61 42 78 70 13 8	600-16,500 600-7,200 600-7,500 Under 5,100 1,650-16,700 600-2,600 600-11,000 Under 1,650	14.5 0.1 } 1.0 } 0.7 } 2.7
į				Total	19.0

west or north-east monsoon is blowing; while in the south of the continents, where no lands intervene, there is a continuous eastward movement of the waters. The charts showing ocean curlents are compiled from papers of each ocean, see under ATLAN-

Vertical movements affect the surface only in very restricted areas, such as the windward side of the oceans in trade-wind regions. The vertical movements

of the layers between 500 and 2.500 ft. have already been noted. These are associated by Schott with the distribution of atmospheric pressure—high at the tropics, low at the equator; but it is necessary to consider the inter-mediate links of almost cloudless, rainless conditions round the tropics, the great evaporation and high salinity of these waters, as well as the direct pressure of the atmosphere. According to Schott the waters below 2,500 ft. have a slow movement towards the equator, the slowness being due to the greater depth of water, which carries a sufficiently vast volume to replace the overplus of surface waters driven northwards and southwards from the equatorial regions; for the eastern currents of the ocean carry less water to the equator than the western currents carry away from it. Dr. Nansen has recently called in question the possibility of explaining oceanic circulation with reference to atmospheric conditions except for the superficial layers, and has revived the hypothesis that differences of density and the rotational component suffice, along with a consideration of the contour of the oceanic basin, to account for the observed phenomena. For waves, tidal movements, and currents, see WAVE, TIDES. For oceanic meteorological conditions, see METEOROLOGY. For applications of oceanography and ocean meteorology to navigation, see NAVI-GATION. For life in the ocean, see GEOGRAPHICAL DISTRIBU-

The ocean floor is covered with deposits, which are derived from the more permanent remains of dead organisms which have sunk mixed near the land with terraqueous deposits. The characteristics, depths, and areas of these different deposits are summarized in Table G, after Mur-

Permanence of Ocean Basins.— The limit of blue mud has been taken to roughly indicate the margin of the more labile part of the earth's crust, and until the discovery of red clay in Barbados it was thought that this deposit of very deep waters had never been raised above sealevel, and that seas deeper than from 12,000 to 13,000 ft.—roughly one-third of the carth's surface represented primeval basins. Against this theory may be cited the similarities of the floras of the land-formed rocks of parts of eastern S. America, S. Africa, Deccan, and Australia, which seem to indicate an earlier land connection, and the recent discovery on the Valdivia expedition of layers of red clay lying above deposits of

blue clay and limy type at depths of 23,700 ft., near the equator, in the Atlantic (0° 11' s.,

A fairly accurate determina-tion of the depth of water under a ship on the deep sea may be made by the bathometer, a delicately constructed spring-balance instrument which is sensitive to the difference between the gravitational effect of sea water (density, 1'028) and that of solid rock

(aver. density, 2.75).

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Ocean Currents. See above. Oceania, a general term for the islands of the Pacific Ocean, or South Sea. Excluding Australia and New Zealand, the total land area is only some 60,000 sq. m., scattered over a vast extent of ocean—for 30° on either side of the equator-from the Hawaiian or Sandwich Is. on the N. to the Cook or Hervey Is. and Pitcairn I. on the s. Many of the islands are of volcanic origin, but the great majority are coral atolls. See Micronesia, Melanesia, POLYNESIA, FIJI, and the other groups of islands.

Ocean Steamship Company was established in 1865. In 1902 the company acquired the con-trol of the China Mutual Steam Navigation Co. Together they possess a fleet of 51 steamers, having an aggregate of 261,617 tons; and services of cargo steamers are maintained between Glasgow. Bristol Channel ports, Liverpool and the Straits Settlements. China, Japan, and across the Pacific to British Columbia and Puget Sound; between Liverpool and Sumatra and Java; between Singapore and West Australian ports; and between Glasgow and Australia.

Oceanus, in Greek mythology the god of the ocean, the son of Uranos and Gæa, the husband of

Tethys, and the father of all river gods and water nymphs. The early Greeks regarded the ocean as a huge river encircling the earth, which was held to be flat; out of it and into it the sun, moon, and stars rose and set; the dwelling of the dead was on its banks.

Ocelot (Felis pardalis), a wild cat of tropical America, remarkable for the beauty and variability of its coloration. It varies in length from three to four feet, exclusive of the tail, which measures from eleven to fifteen inches. The ground colour is generally a shade of yellow or brown, and is marked by spots of black, arranged in streaks and blotches. The ocelot is an admirable climber, and is a typical forest animal, preying upon birds and small maininals.

Ochakov, tn., Kherson gov., S.W. Russia, 38 m. E.N.E. of Odessa, on the Black Sea, with fisheries and fish-salting.

(1897) 10,784.

Ochiali, or ALI EL-ULUJI (b. 1508), celebrated corsair, native of Calabria. As pasha of Algiers he recaptured Tunis for the Sultan Selim II., and gained a signal victory over the Turks off the Sicilian coast in 1570. See Poole's The Barbary Corsairs (1890).

Ochil Hills, in Scotland, of volcanic origin, and rich in minerals, running 25 m. from s.w. to N.E., between the counties of Clackmannan, Kinross. and Fife in the s.E., and Perth in the N.W. The chief summits are Bencleuch (2,363 ft.), King's Seat (2,111 ft.), and Dunmyat (1,375

ft.). Ochiltree, vil. and par., Kyle dist., Ayrshire, 18 m. s. of Kil-marnock, on the southern bank of Lugar Water. Pop. of par. (1901)

1,932

Ochino, BERNARDINO (1487–1564), Italian reformer, born at Siena, left the Observantine Franciscans in 1524 for the severer rule of the Capuchins, of which he became vicar-general (1538). Summoned in 1542 before the Inquisition at Rome on a charge of heresy, he took refuge in England. On the accession of Mary he withdrew to Zürich. He is chiefly remembered for his *Tragedia* (1549; and in Eng-lish), a remarkable series of dialogues which probably contributed to Milton's Paradise Lost, and for his Dialogi XXX. (1563). See Benrath's Bernardino Ochino von Siena (1875; Eng. trans. 1876).

Ochna, a genus of evergreen tropical shrubs, order Ochnaceæ, with racemes of yellow flowers, followed by succulent fruits of ten, five, or fewer carpels placed on the enlarged receptacles. The plants may be cultivated in the stove, in a well-drained peaty loam.

Ochre, red, brown, or yellow hydrated oxide of iron, which occurs naturally, more or less mixed with clay or sand. Earthy incrustations of the oxides of other metals, such as antimony or bismuth, are also described as ochres, but are of less importance. The red or yellow ochres are prepared for use by grinding and washing, and are employed for making paints, and for colouring linoleum, paper, and other substances.

Ochrida, tn., European Tur-key, on lake of same name; the seat of a Bulgarian bishopric. Pop. 18,000.

Ochteriony, Sir David (1758 -1825), British general, born at Boston, United States, of Scot-tish parentage; entered the service of the East India Company in 1777, and defended Delhi against Holkar (1804). He is chiefly remembered for his success against the Ghurkas in Nepal (1814-16). He also took an important part in the hostilities against the Pindaris and Mahrattas (1817-18).

Ocimum, a genus of subtropical and temperate herbs and sub-shrubs belonging to the order Labiatæ. They bear racemes of flowers arranged in whorls of six to ten. The best-known species is the sweet basil (O. basilicum), an annual grown in Britain as a half-hardy herbaceous plant. Other species are O. minimum, the bush basil, from Chile; and O.

viride, the so-called fever plant of W. Africa. Ockham, or Occam, William of (d. c. 1349), English schoolman, rival of John Duns Scotus, was a native of Ockham, Surrey. Entering the Franciscan order, he became a lecturer at the University of Paris. He defended the original Franciscan teaching of poverty, which resulted in an open breach with the Holy See. Taking refuge with Louis of Bavaria, he was received as general of the order by his supporters (1342). In politics he supported the temporal against the pontifical power, and in philosophy he revived nominalism against realism. Among his works are Opus Nonaginta Dierum (written c. 1330, published 1495); Compendium Errorum Johannis XXII. Paper (c. 1335); and Super tate Summi Pontificis octo Quers-Decisiones (c. 1339); tionum Decisiones (c. 1339); Summa Totius Logicæ (1488); Quæstiones in Quatuor Libros on the Sententia of Peter Lombard (1495).

Ockley, SIMON (1678-1720), Orientalist, educated at Cam-bridge, passed most of his life as vicar of Swavesey, near St. Ives,

but was appointed professor of Arabic at Cambridge (1711). His chief work was a History of the

Saracens (1708-18).

O'Connell, Count Daniel (?1745 1833), French general, entered the Royal Suddois regiment (1760); was adjutant of Clare's regiment of the Irish Brigade (1771), was present at the siege of Gibraltar (where he saved the life of Charles X.), and was created count (1785). While an emigré he submitted to Pitt (1792) a scheme for an Irish brigade of six regiments, and became colonel of the fourth. He died at Blois, making 'the Liberator' (his nephew) his heir. See O'Connell's Last Colonel of the Irish Brig e le (1892).



Daniel O'Connell.

O'Connell, DANIEL, 'the Liberator' (1775-1847), Irish politician, born near Cahirciveen, Co. Kerry. He was called to the Irish bar (1798), entering Parliament (1830). Both as pleader and cross-examiner he was unrivalled; and, recognized as a Catholic leader (1810), his speech for Magee (1813) made him the protagonist of Roman Catholicism, eventually involving him in a duel (1815). His denunciation of Quarontotti's rescript (1814), permitting the British government to veto appointments of Roman Catholic bishops, led to its withdrawal. On Grattan's death (1820) O'Connell turned to the people in the cause of Catholic emancipation. The year 1828 witnessed O'Connell M.P. for Clare, and also his last appearance at the bar in the Doneraile conspiracy case, in which he saved one hundred and fifty lives by his advocacy. He sat in the Reform Parliament, which he had helped to create. Greeting the Tories with a revival of repeal

(1840-3), he organized monster meetings, the largest of them at Tara. The meetings were proclaimed, and O'Connell was tried and imprisoned for seditious conspiracy; but the judgment was reversed on appeal. He now fell back upon federalism ('Home Rule'); but 'Young Ireland' rose against him. He died at Genoa while on a pilgrimage to Rome. See Lives by O'Connell (1846), Hamilton (1888), and MacDonagh (1903); Lecky's Leaders of Public Opinion in Ircland (new ed. 1903). O'Connor, or CONNOR, BERNARD (?1666-98), physician and author, of Irish birth, after Sobieski, king of Poland, was a lecturer at Oxford and in London. He published Disserta-tiones Medico-Physica (1695), and Erangelium Medici (1697), which, since it pointed to a natural explanation for the miracles of the New Testament, aroused considerable opposition. His History of Poland appeared in 1698.

O'Connor, FEARGUS EDWARD (1794-1855), Chartist leader, born in Co. Cork, Ireland; was returned to Parliament for his county (1832). At first identified with the movement for the repeal of the union, he severed himself from O'Connell on a question of leadership, and devoting himself to the cause of Radicalism in England, subsequently rose to the lead of the Chartist movement, the organ of which, the Northern Star, he edited. See Gammage's History of Chartism (1854), and II story of the Chartist Movement

0'Connor, SIR NICHOLAS RODERICK (1843), British diplomatist, entered the diplomatic service in 1866. He has been charge d'affaires at Peking (1884-86), consul-general in Bulgaria (1886-92), minister at Peking (1892-5), at St. Petersburg (1895-98), and has been ambassador at Constantinople since 1898.

O'Connor, RODERIC (1116-98), king of Ireland, succeeded as king of Connaught (1156) and king of Ireland (1166). Defeated by Richard Strongbow (1171), he was forced to conclude a treaty with Henry II.; but never fully submitting to English rule, he was ultimately deposed. See O'Conor Don's O'Conors of Connaught (1891).

O'Connor, THOMAS POWER (1848), Irish politician and journalist, was born at Athlone. He early found employment on the staff of the Daily Telegraph, which he left to become an assistant in the office of the New York Herald. He entered Parliament as member for Galway (1880), and soon became a prominent member of the Parnellite party. Since 1885 he has been

one of the members for Liver-pool. In 1883 he was elected president of the Irish Nationalist League. He is generally known as T.P., and is the man who made the Sun, M.A.P., T.P's Weekly, and P.T.O., all of them instantaneous and brilliant successes. His works include Lord Beaconsfield, a Biography (1879; 2nd ed. 1884); (Iladstone's House of Commons (1885); The Parnell Movement (1886); Some Old Love Stories (1895); Napoleon (1896); In the Days of My Youth (1900).

In the Days of Day
Oconto, city, Wisconsin,
U.S.A., co. seat of Oconto co.,
on Green Bay. Has large lumber, fishing, brewing, flour-milland canning industries.

ing, and canni Pop. (1900) 5,646.

Octans, a small constellation formed by Lacaille in 1752. The south pole of the heavens is situated near σ Octantis, a star

of 5'8 magnitude.

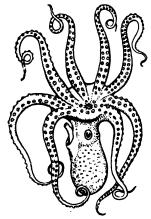
Octave, in music. The interval of an octave—the most perfect consonance in music—is produced when the higher of two sounds contains double the number of vibrations of the lower sound. The higher sound then constitutes the first upper-partial in the harmonic series generated by the lower sound. The eighth note of a diatonic scale is always the octave of the first note. The term octave is also applied to the series of notes forming a scale -c.g. an octave of the scale of C.

Octavia. (1.) The sister to Augustus, the Roman emperor, and was married, first, to Gaius Marcellus, consul in 50 B.C., and after his death to the triumvir Mark Antony, in 40 B.C. For some years her influence kept Augustus and Antony at peace; but after-wards Antony's abandonment of her for Cleopatra led to the war between him and Augustus. Octavia died in 11 B.C. (2.) The daughter of the Emperor Claudius and Messalina : was married to Nero, who first divorced her on the plea of sterility, and then (62 A.D.) had her put to death on the charge of adultery.

October. See YEAR. Octomeria, a genus of epiphytal orchids, natives of Brazil and the W. Indies, bearing dense clusters of small white or yellow flowers, and easily cultivated in

peat and sphagnum.

Octopus, an eight-armed cuttle. To the genus Octopus belong an enormous number of species, of which one, O. vulgaris, is found off the British coast. The most generally distributed British octopod is, however, a member of the genus Eledone, with only one row of suckers down the arms, in place of the two of octopus. From their allies, the ten-armed cuttles, the octopeds differ not only in the number of the arms, but also in the absence of the internal shell, the fact that the suckers are sessile instead of stalked, that the body is short and rounded instead of elongated. Octopods typically lurk on the sea-bottom, but many species have their arms webbed, and can swim with great swiftness. Like other cuttles, they possess considerable power of colour change. Their eggs are fixed to a common stalk attached to a stone or rock. Each egg cluster may contain 1,000 eggs, and the female may produce from forty to fifty of such clusters in one season. See Cuttles.



Common Octopus.

Octroi has, from its former general meaning of a command supported by royal authority, developed a specialized meaning viz. that of a tax levied on articles passing into a town, e.g. in France and Italy.

O'Curry, Eugene (1796-1862), Irish scholar, who issued useful text, with translations, of Irish poetry. He was appointed professor of Irish history and archæology at the Catholic University of Ireland (1855). His lectures On the Manners and Customs of the Ancient Irish appeared in 1873. See Memoir in Irish Monthly Magazine, April 1874.

Od. See REICHENBACH, BARON. Odal. See ALLODIAL.

Oddfellows, a social and benevolent order, founded in London in 1745. The Independent Order of Oddfellows (Manchester Unity) was formed in Manchester in 1813, and is one of the oldest of friendly organizations. At the end of 1904 the total adult membership was 1,021,474, and the juvenile members numbered 117,897. The society comprises 4,920 lodges, divided into 448 districts. The total capital £12,524,635. amounts The order is also strongly represented in th United States and the Colonies. the Ode, a Greek term for a lyric

or melic poem sung to a musi-cal accompaniment. Two main forms of ode emerge in Greek poetry. The first consists of a series of uniform stanzas constructed on a somewhat elaborate metrical system. This was used for the personal lyric of Aleman of Sardis, Sappho and Alexeus of Lesbos, and Anacreon of Teos, and may be called the Æolic, or, from its adoption for the imitative Roman lyric, the Horatian ode. The other is the Dorian or choric ode, designed for singing by groups of voices, answering each other or in unison. The origin of this is ascribed to Stesichorus of Himera, who fixed the threefold structure of the strophe and antistrophe, sung by two half-choirs, and the final epode, sung by the whole body. This is the variety of ode used by the Attic dramatists, by Pin-dar of Thebes, and by Bacchy-lides of Ceos. In the wider sense the ode may be classed as belonging to lyric poetry, but is generally long, elaborate in its stanzaic form and in the arrangement of its rhymes, and inspired by the impersonal emotions of admiration, or of moral, religious, or philosophic ardour. Many odes are elegiac rather than purely lyrical in tone. In English poetry the Horatian ode exists in every degree of elaboration, from simple stanzas of Marvell's Upon simple stangas of marveil's Choin Cromwell's Return from Ireland, Collins's To Evening, Wordsworth's To Duty, or Shelley's To a Skylark, to the elaborate schemes of Spenser's Epithalamion, Milton's Hymn on the Morning of Christ's Nativity, Shelley's To the West Wind, Keats's To a Nightingale, Arnold's Thyrsis, Swinburne's Are Atque Valc. The choric ode, in its strict form, is used by Congreve, Gray, and other 18th-century writers, and in such modern imitations of classical tragedy as Matthew Arnold's Merope. More frequent, however, is a third type, the so-called 'irregular ode.' This is written neither in strophe, antistrophe, and epode, nor in uniform stanzas. It has sometimes a continuous movement throughout; is sometimes divided, in accordance with transitions of thought, into irregular sections. In either case it consists of a succession of iambic lines, of differing lengths and variously rhymed, upon no fixed system, but as the instinct of the poet may suggest. The irregular ode is said to have its origin in Abraham Cowley's failure to understand the strophic arrangement of Pindar. Dryden's To the Pious Memory of Mrs. Anne Killigrew, Wordsworth's Intimations of Immortality, and Tennyson's On the Death of the Duke of Wellington are amongst its triumphs; and its use by Coventry Patmore and Mr. Francis Thompson has given it an especial prominence in recent verse. See E. Gosse's English Odes (1881) and Sharp's Great Odes (1890).

Odenathus (assassinated 266 A.D.), prince of Palmyra in Asia, who kept the Persians in check after they had defeated and captured the Roman emperor Valerian (260 A.D.). For these services he was rewarded by Gallienus with the title of Augustus. He was succeeded by his wife, the

famous Zenobia

Odenburg. See OEDENBURG. Odenkirchen, tn., Rhine Prov-ince, Prussia, on the Niers, 21 m. s.w. of Düsseldorf; manufactures silks, velvets, cottons, linens, and leather. Pop. (1900) 14,745.

Odense, tn., Denmark, cap. of Fünen, and see of a bishop, 80 m. s.w. of Copenhagen. It has the churches of St. Knud (11th century) and Our Lady (12th century). Exports butter, cheese, hides, bacon, corn, and molasses. It was the birthplace of Hans Andersen, Pop. (1901) 40,138.

Odenwald, mountainous dist., S. Germany, lies E. of the Rhine, between the Main and the Neckar. The highest peak is Katzenbuckel (2,057 ft.). The district, which is richly wooded, is noted for its

scenery and its legends.
Oder (Lat. Viadrus), river of (termany, rising in the Sudetic Mts. in Moravia, and after a course of 563 m. falls at Stettin into the Pommersches Haff, which is connected with the Baltic by three arms. The most important tributaries are, on the left, the Neisse, the Katzbach, and the Bo-ber; and on the right, the Warthe. By means of the Finow Canal the Oder is connected with the Havel, and with the Spree by the Friedrich Wilhelm Canal. The river is navigable as far as Ratibor.

is navigable as far as natiour.

Odessa, tn. and port on the
Black Sea, in Kherson gov.,
S.W. Russia, 85 m. w.s.w. of
Kherson city. It is the fourth
largest town in Russia and the
second port of the empire. The second port of the empire. The harbour faces a great bay which forms the N.W. extremity of the Euxine. The roadstead is ex-posed, but four artificial harbours (besides ample docks) supply excellent accommodation. In ordinary winters it freezes for a few days only. The town is much better built than most Russian cities: the streets and squares are broad, well paved and kept, with plenty of trees; some of the main arteries are very fine. Among the chief build-

ings are the cathedral, the town hall, the city library, the museum of antiquities (containing many Graco-Scythian remains from the Crimea and Black Sea coast), the theatre, the imperial palace, the residence of the governor, the courts of justice, and the bourse (1899). The university (with over 1,000 students), inaugurated in 1865, has a good library and historical and biological collec-The trade of Odessa to over £20,000,000 tions. amounts (nearly £16,000,000 exports, and over £4,000,000 imports). The chief exports are flour, wheat, barley, rye, maize, oats, oilcake, sugar, pease, beans, alcohol, caviare, fish, horses, sheep, cattle, poultry, game, skins, and wood. Catherine II. founded Odessa by a rescript of May 24, 1794. From 1817 to 1859 it was a free port. The French émigré noble, the Duc de Richelieu, was the first gover-nor (1803-14), and did much for Odessa. In 1854 the Anglo-French squadron attacked the town without result, and in 1876-7 the Turkish warships blockaded it with equal ineffectiveness. During the Russian revolutionary and anti-Semitic outbreaks of 1905, Odessa suffered severely, and was the scene of much fighting and de-struction of property. The town struction of property. The town was also for a time terrorized by the mutinous Black Sea fleet. Pop. (1897) 405,041.

Odeum, a name given to buildings intended for musical contests and performances. They were similar in shape and con-struction to theatres, but smaller, and roofed over. The first odeum at Athens was built by Pericles. Another and larger odeum was built on the southern slope of the Acropolis by Herodes Atticus (c. 120 A.D.); its ruins still exist.

Odeypoor. See UDAIPUR. Odhner, Klas Theodor (1836–1904), Swedish historian, professor of history at Lund (1871), member of the Swedish Academy (1885), and royal record keeper (1887). His chief works are Sveriges Politiska Historia under Koning Gustaf III.'s Regering (1895-1900) and Orsakerne till Gustaf II. Adolfs deltagande i 30 åriga Kriget (1882).

Odin, WODEN, or WUOTAN was the supreme god of the Teutonic tribes, the bestower of wisdom and valour. Under the influence of Roman ideas he became iden-tified with Mercury, and thus the Dies Mercurii was Teutonized into 'Woden's Day' (Wednesday). Cattle and horses, captive enemics, and even the old and frail members of a tribe, were sacrificed to him until the middle ages (Elton's Origins, 2nd ed. p. 125). This was frequently done by pushing the victims over a high cliff.

Odoacer, the king of the Germanic tribe of the Heruli, who led the barbaric invasion which overthrew the western empire of Rome (476). He took the title of king of Italy, and reigned until he was overthrown by Theodoric, king of the Goths (493).

574

O'Donnell, LEOPOLD, DUKE OF TETUAN (1809-67), Spanish general and statesman, was born in Tenerife, of Irish descent; served in the army of Queen Christina, and while sharing her exile (1840-43) made efforts to secure her restoration. He became minister of war under Espartero (1854), premier (1856 and 1858), and successfully conducted the war with Morocco (1859), for which he received his dukedom.

O'Donovan, JOHN (1809-61), Irish historian and archæologist, translated the Battle of Magh Rath (1842) and the Annals of Ircland by the Four Masters (1848-51), and wrote an excellent Grammar of the Irish Language (1845). He was professor of Irish in Queen's College, Belfast, was actively engaged on the Ordnance Survey of Ireland, and prepared a translation of the Brehon laws. flowers, and thrive in a well-drained soil which contains a fair proportion of leaf-mould.

Odysseus, one of the chief Greek leaders in the Trojan war. The Latin form of his name is Ulysses. His wife was Penelope, and their only child Telemachus. In the war he distinguished himself by his prowess, and also by his wisdom and eloquence. He was one of the heroes who entered Troy in the wooden horse, the idea of which some authorities attribute to him. After the fall of Troy he wandered for ten years, meeting with the many adventures recorded in the Odyssey. Odysseus's wanderings reflect carly Greek geographical know-ledge, but so vaguely that it is uncertain whether their scene should be placed on the coasts of Sicily and Italy, or, as more recent writers hold, in the Black Sca. Odysseus, in his courage, his coolness, his patience under misfor-tune, and above all in his ready wit, absolute lack of scruple, and delight in deception, was the ideal Greek of the time of the poet, as he is, in som : respects, the typical Greek of the present day.



Odontornithes: Skull of Hesperornis regalis.

Odontoglossum, a genus of tropical American orchids. The flowers have spreading, free se-pals and nearly equal petals. Some of the species require the temperature of the intermediate house, some do well in the cool house when the temperature is not below 38° F., whilst a few are grown suspended in baskets or on rafts in the open air under trees.

Odontopteryx, a fish-cating fossil bird, the skull of which has been found in the London

Clay of Sheppey I.

Odontornithes, fossil toothed birds. birds. No existing birds have teeth in the adult condition, though in the young embryos of parrots rudimentary teeth have been found. In Cretaceous and Jurassic strata birds have been found having many conical teeth in both jaws, resembling closely those of existing reptiles. Among the groups most fully known are Hesperornis, Archæopteryx, and Ichthyornis. See Marsh's Mono-graph of the Odontornithes (1880).

Odontospermum, a genus of herbaceous composite plants, mostly natives of the countries bordering on the Mediterranean. They bear large heads of yellow

Odyssey. See HOMER.

Œcolampadius, JOANNES (1482-1531)—Latin-Greek form of Hausschein, itself an altered form of the original Hussgen-German reformer, born at Weinsberg. In 1515 he became a preacher at Basel, where he assisted Erasmus in the preparation of his New Testament. In 1518 he pub-lished his Greek Grammar. It was Zwingli who, after 1523, influenced him chiefly; and him he ably supported in a controversy with Luther on the subject of the eucharist. See Lives by Herzog (1843) and Hagenbach (1859).

Ecumenical, or ECUMENICAL, a term applied to those church councils at which the whole Christian world was represented. (See COUNCILS.) The cecumenical symbols are the three great creedsthe Apostles', the Nicene, and the Athanasian.

Cidems, in pathology, the swelling of any part, dae to an unusual quantity of blood serum in the tissues. It is commonly seen first either where the tissues are normally loose, as about the eyes, and particularly under them, or at the extremities, where the circulation is less

rapid. Obstruction of the vessels, from external pressure or from blocking by a clot or embolus. will cause edema behind the obstruction, and is a common symptom in Bright's disease and in affections of the heart. Treatment depends upon the cause, but the general line of procedure s to assist the heart's action by keeping the sufferer recumbent, strengthening the cardiac impulse, and relieving the tissues of the fluid by dimetics.

Oedenburg (Hung. Sopron), tn., cap. of co. of same name, Hungary, 58 m. by rail s.w. of

Hungary, so in by rain s.m. of Presburg. Manufactures sugar, preserved fruit, agricultural implements. Pop. (1900) 33,478. **Edipus**, in ancient Greek legend, a king of Thebes in Beotia, the son of Laius and Jocasta, and father of Eteocles, Polynicas Antigone, and Igmene. Polynices, Antigone, and Ismene. His father had been warned by the Delphic oracle that he would perish by the hands of his own son. Accordingly, when Cedipus was born, Laius had him exposed on Mt. Cithæron, with his feet pierced and bound. A shepherd found him, and took him to Polybus, king of Corinth, who adopted him as his own son. Œdipus, having gone to Delphi, met Laius and slew him. He then made his way to Thebes, slew the Sphinx, wedded Jocasta, and ruled in prosperity for many years. At last a pesti-lence ravaged the land, and the oracle of Delphi declared that, to deliver the people from it, the murderer of Laius must be expelled. Œdipus learned from the prophet Tiresias that he was the man, and also that he was Laius's son, and had married his own mother; whereon he blinded himself, and Jocasta took her own life. He wandered as a beggar until he found refuge in Attica, where he died at Colonus, near Athens. The story is best told in Sophocles's Œdipus Rex and Edipus Coloneus. See also Eschylus's Seven against Thebes, and Euripides's Phænissæ.

Œdogonium, a genus of freshwater algae belonging to the division of the Confervoideze; characterized by the thallus being composed of unbranched filaments, the swarm spores, oogonia, and antheridia being formed from the cells of the filaments. They

form the green masses which fringe stones, etc., in the water.

Ghlenschläger, ADAM GOTTLOR (1779-1880), romantic poet of Denmark. Under the influence of the green the control of the green the gre ence of Steffens he became acence of stenens he became acquainted with German romantic literature, and his Digte (1803) marked the beginning of a new era in Danish literature. In 1805 appeared two volumes of Particle Christian including Alada. Poetiske Skrifter, including Alad-

din, a beautiful poetical version of one of the tales in the Arabian Nights. From 1805 to 1809 he Nights. From 1805 to 1809 he visited the Continent at the expense of the Danish government, made the acquaintance of the great German writers, and wrote, among other things, his famous tragedies from Scandinavian subjects, Haakon Jarl (1805), Baldur hin Gode (1807), Palnatoke (1807), and Axel og Valborg (1808). In 1814 appeared Helge, and in 1819 Nordensguder. His feud with the critic Baggesen divided Danish literature into two hostile camps. The most successful of his later works is the tragedy Disa (1842). Best critical editions of his works by Liebenberg, Poetiske Skrifter (1857-62), in 32 vols.; his own autobiography



(Enothera biennis. Germen and calyx tube; 2, capsule, opened; 3, section.

(1830-31), Arentzen's Baggesen og Ehlenschläger (1879), and Niel-sen's A. Ehlenschläger (1879.)

Ochler, Gustav Friedrich. See Ohler.

Oeland. See OLAND.

Oels, or Ols, tn., Silesia, Prussia, 20 m. E.N.E. of Breslau; manufactures agricultural implements, cloth, and boots, and has a 16th-century castle (restored 1894). Pop. (1900) 10,600.

Ocisnitz, tn., Saxony, Germany, on the Weisse Elster, 26 m. s.s.w. of Zwickau; manufactures carpets, curtains, and machinery. Pop. (1900) 13,600.

Enocarpus, a genus of tropical palms, natives of S. America. They bear great spikes of monœcious flowers, followed by dark-coloured oval one-seeded fruits. The leaves are pinnate, and borne in terminal crowns. The species

are not difficult of cultivation in the temperature of the stove, in

a well-drained peaty soil. **Enomaus**, king of Pisa in Elis. according to ancient Greek legend, and father of Hippodamia. See PELOPS.

Œnomel, a sweet liquid prepared from a mixture of wine and honey. This is distinct from oxymel, which is the name given to a mixture of soured wines or of vinegar and honey.

Œnone, in ancient Greek legend the wife of Paris, the son of Priam, king of Troy, before he deserted her for Helen. Her story is told in Tennyson's Enoue.

CEnophyta, tn. in Bœotia in ancient Greece, on l.bk. of Asopus. Here the Athenians defeated the Bœotians (457 B.C.) and gained possession of Bootia.

Enothera, a genus of herbs and shrubs belonging to the order Onagrariaceæ. They generally bear showy flowers, which very commonly bloom at night, whence their popular name of evening primrose. The flowers have four petals, obovate in form.

Cersted, HANS CHRISTIAN (1777-1851), Danish physicist, discoverer of electro-magnetism, became at Copenhagen in 1806 professor of physics. His great discovery was dealt with in Experimenta circa effectum condictus Electrici in acum Magneticam (1820); while he also published Naturburens Mechaniske Decl (1844), Aanden i Naturen (1849-50), To Capitler af det Skjönnes Naturlære (1845). See Life by Naturacre (1845). See Life by Hauch and Forchhammer; Ger.

trans. by Sebald (1853).

Oesel, isl. in Baltic Sea, at entrance of Gulf of Riga, forming part of Livonia gov., N.W. Russia; area 1,047 sq.m. Pop. (1897)56,000. Forestry is valuable; horse, cattle, and sheep rearing are important; and the coast fisheries and fowling (especially of seals and wild swans) are celebrated. Tar is manufactured, and there is a famous breed of small, hardy ponies. The only town is Arensburg (pop. 4,621).

Œsophagus. See GULLET. **Oesterreich.** See AUSTRIA

and Austria-Hungary. Octinger, Christoph Fried-Rich (1702-82), theologian, who developed a theosophic system which he set forth in sermons and works collected by Ehmann (1858). See his Autobiography (1845), Auberlen's Die Theosophie Octingers (1848), Ehmann's Octingers Leben und Briefe (1859), and Wächter's Bengel und Octinger (1885).

Ofen, Hungary. See Buda-

Ofen Pass, a pass (7,071 ft.) which leads from the Lower Engadine or Inn valley (Swiss canton of the Grisons) to the Swiss

valley of Münster, and so down to the head of the Adige valley at Glurns or Mals, and to the Reschen Scheideck road.

Offa, king of Mercia from 757 to 795. To prevent the raids of the Welsh he built a ditch or rampart from Flintshire to the Severn, near Bristol, known as Offa's Dike.

Offenbach, tn., grand-duchy of Hesse, Germany, on 1. bk. of Main, 3 m. E. of Frankfort. It is a great industrial centre, and exports leather goods, carriages, chemicals, soap, carpets, varnish, etc. Pop. (1900) 50,468.

Offenbach, JACQUES (1819-80),

of the Théatre Français orchestra (1848), and in 1855 took the Théatre Comte, which he renamed Bouffes Parisiens. Here he produced over seventy popular operettas. Amongst the best known are Orphée aux Enfers (1858), Geneviève de Brabant (1860), La Grande Duchesse (1867), Madame Fuvart (1878), and Les Contes d'Hoffmann (1881). See Life by Martinet (1892).

Offenburg, tn., Baden, Germany, on the Kinzig, 27 m. s.w. of Baden, manufactures cottons, linens, glass, agricultural implements, and leather. Pop. (1900)

13,664

Offensive and Noxious Trades. There are certain trades in which animal matter is worked up, producing offensive odours, that cannot be started in an urban district without the consent of the public health authority—the principal being those of blood-boiler, bone-boiler, fell-monger, soap-boiler, tallowmelter, tripe-boiler. It has been held that a brickmaker, or even hospital for the treatment of infectious diseases, cannot be prohibited under the act. The trades enumerated are not, per se, unlawful if conducted in a proper manner and in a proper place. These trades are regulated by the Act of 1875, s. 112-116, and by the London Act, 1891, s. 19-22.

Offertory. The alms which are collected at divine service are very commonly called the offertory, but the term is rightly applicable to the solemn offering up of these alms and the oblation of the bread and wine in the

eucharist.

Officer, a term which, when standing alone, is understood to apply exclusively to a commissioned officer. Colonels, lieutenant-colonels, and majors are field officers; and captains, lieutenants, and sub-lieutenants company officers. The active list of the army includes officers serving on full pay and those on half-pay; but

the legal status of officers on retired pay is also secured to them by the Army Act. While on full pay officers are disqualified from holding any municipal office; they are absolutely exempted from service on a coroner's jury, and from being placed on the jury list for grand and common juries; nor may they act as directors of public companies. No officer on the active list is allowed to leave the United Kingdom without special permission from the War Within the service, an officer can only be punished after trial by a general court-martial. Any officer may be dismissed at his Majesty's pleasure. For officers in the navy, see NAVAL OFFICERS.

Official List. See STOCK Ex-

CHANGE.

Official Secrets. It is a misdemeanour punishable by one year's imprisonment—(I) to wrongfully enter a military building with intent to acquire information; (2) to unlawfully obtain a copy of public documents; (3) for an official to communicate official secrets. It is a felony punishable with penal servitude for life to perform such acts with intent to communicate them to a foreign state. It is a misdemeanour to incite another to commit such offences. All prosecutions must be sanctioned by the attorney-general (Official Secrets Act, 1889).

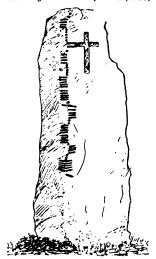
Officinal Plants. See PHAR-MACOPÆIA.

Ofterdingen, HEINRICH VON, German 'Minnesinger,' is mentioned in a poem of the 13th century, Der Sängerkrieg auf der Wartburg, as having taken part in a tournament of song before Hermann, landgrave of Thuringia. He is also the subject of the romance of Novalis, Heinrich von Ofterdingen (1799). His existence as a historical personage has, however, never been entirely established.

Ogaden and Gosha, dist. of British E. Africa, bounded on the E. by Juba, on the s. by the equator, on the w. by Tanaland. Ogaden was taken over by the British government in 1895.

Ogam or Ogham Speech and Writing. The Gaelic word oyam or ogham has been alike applied to a peculiar form of speech and to a peculiar script, both very ancient. The chief characteristic of the former was that the names of letters were inserted in words, in certain syllables, in lieu of the letters themselves. The result was a complete disguise of Gaelic to all but the initiated. These were at first poets, musicians, and men of learning; but Professor Kuno Meyer has shown (Gypsy Lore Journal, 1891, vol. ii.) that Ogham speech is still

current among existing Irish tinkers and vagrants. The script was apparently not employed to express the jargon; but it received its name because it, too, was cryptic. There were several varieties—e.g., Wheel-4)gham (which St. Columba was able to read), Bird, Colour, Hill, Church, and Tree Ogham, the best known. The key still in use for transliteration was first given in the 14th-century Book of Ballymote, and reproduced in Brash's work (1879). This script was used for writing messages and letters, generally on wooden staves, but sometimes on shields. But the specimens chiefly studied to-day are the numerous inscriptions on archaic stones mostly found in Ireland. See Brash's Ogam-inscribed Monuments (1879); Ferguson's Ogham Inscriptions (1887).



Oyam-inscribed Monument, Tralee, Co. Kerry.

Ogden, city, Utah, U.S.A., the co. seat of Weber co., on the Weber R., 35 m. N. of Salt Lake City; has woollen mills, canning factories, brick and tile works, etc. Pop. (1900) 16,313.

Ogdensburg, city, St. Lawrence co., New York, U.S.A., on the St. Lawrence. Pop. (1900)

12,633.

Ogham. See Ogam.
Ogilby, John (1600-76), dancing-master, translator, and printer, native of Scotland; entered the household of the Earl of Strafford (1633). Ruined by the civil war, he supported himself by making translations of Virgil and Homer, but at the restoration he gained employment at court. He established a publishing business in London, and issued maps and road books.

Ogilvie, John (1797-1867), Scottish lexinographer; prepared an enlarged edition of Webster's Dictionary, the imperial Dictionary (1855; later ed. 1882-3). In 1865 he published the Students' English Dictionary, of which a condensed edition appeared in 1867.

Ogilvy, Gavin. See Barrie, J. M.

Oglethorpe, JAMES EDWARD (1696-1785), English philanthropist, soldier, and founder of the colony of Georgia. After serving under Prince Eugene on the Continent, he entered the Commons as member for Haslemere (1722). He did much to bring to light the infamous conditions of debtors' prisons, and with a grant of land from the king, and £10,000 voted by Parliament, he sailed in 1732 with one hundred and twenty debtors as settlers, and founded the colony of Georgia. In 1742 he beat off a Spanish attack. Returning to England, he served against the Jacobites in 1745. See Life by Robert Wright (1867).

Ogmore, vil., Glamorganshire, S. Wales, 2 m. s.w. of Bridgend, has a ruined Norman keep, and at the adjacent village of Ewenny a 12th-century priory.

a 12th-century priory.

Ogmore and Garw, coal-mining district in Glamorganshire, S. Wales, 4 m. N.E. of Bridgend.
Pop. urb. dist. (1901) 19,912.

Ogowal, riv. of French Congo, W. Africa, rises about 3° s. and 15° E., and flows N.W., W., and s.w. some 700 m. to the Atlantic Ocean, which it enters by a delta, covering an area estimated at 2,000 sq. m. round Cape Lopez. Rapids and falls render the main stream unnavigable.

O'Grady, STANDISH (1846), author and publicist, has published a History of Ireland, Heroic Period, and Cuculain and his; Contemporaries (1878-80); History of Ireland, Critical and Philosophical (1881); The Crisis in Ireland (1882); The Bog of Stars (1893); Ulrick the Ready (1896); The Story of Ireland (1894).

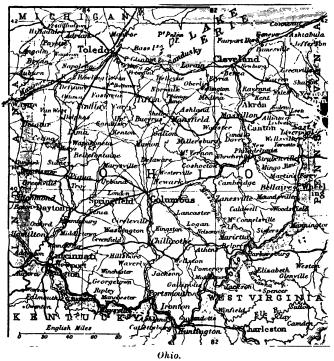
Ogyges, in ancient Greek legend the first king of Thebes; in his day a great deluge is said to have occurred. The adjective Ogygian is used in the sense of primeval.

Ogygia, a genus of trilobites, found in the Ordovician rocks of Europe.

O'Hara, THEODORE (1820-67), American poet, journalist, and soldier; was admitted to the bar, served with distinction in the Mexican war, and subsequently took part as a Confederate officer in the civil war. He is the author of the poem The Bivouac of the Dead. See Memoir by Ranck (1875). O'Higgins, BERNARDO (1776-1842), dictator of Chile, was the son of a viceroy of Peru. Appointed in 1813 to succeed Carrera as general of the patriot army, he was defeated by the Spaniards at Rancagua (1814). After a three years' exile he returned to Chile, and as dictator succeeded in expelling the Spanish troops from the country. Distrust of his liberal policy, however, led to his removal from power in 1823.

Ohio. (1.) One of the north central states of the U.S.A.; area, 41,060 sq. m. It was admitted to the union as a state in

tobacco. In iron and steel manufacturing Ohio ranks second among all the states, and in flour-milling it ranks third. The mineral resources consist principally of coal, petroleum, natural gas, and salt. Iron is smelted mainly in the north-east. Pop. (1900) 4,157,545. The number of foreign born was 458,734, or 11 per cent., and of negroes was 96,901, or 2°3 per cent. (2.) River of the U.S.A., is formed by the junction at Pittsburg of the Allegheny and the Monongahela. From this point its course is generally s.w. till it joins the Mississippi at Cairo, Illinois. Its



1802. The northern part presents little relief, and large areas were originally prairie land. The southern part is deeply scored by stream valleys, and was originally well forested. The Ohio forms the southern and part of the eastern boundary, and into it flow the Muskingum, the Scioto, and the Miami, which drain the greater part of the state. A part of the northern boundary is formed by Lake Erie. The capital is Columbus. The agricultural interests are very large, cultivated land taking up three-fourths of the state's area. The leading crops are Indian corn, wheat, oats, and

principal northern tributaries, the Muskingum, Scioto, Miami, and Wabash, d'ain most of Ohio, Indiana, and a portion of Illinois; while its southern branches, the Tennessee, Cumberland, Licking, Kentucky, Big Sandy, and Kanawha, drain most of Kentucky and Tennessee, and parts of Alabama, N. Carolina, Virginia, and W. Virginia. Its drainage basin is 201,700 sq. m.; the length of the main river from Cairo to Pittsburg is 963 m. This entire length is navigable for vessels of considerable draught, the only obstacle being the falls at Louisville, which are overcome by means of a canal with locks.

Ohlau, tn., Prussian prov. of Silesia, on the Oder, 16 m. s.e. of Breslau. It manufactures cigars and tobacco, boots and shoes, and machinery. Pop. (1900) 9,235.

Ohlendorffia, a genus of tropical shrubs, order Schrophulariacee, mostly natives of Africa. The only species cultivated in greenhouses is *O. procumbens*, a prostrate shrub with little, crowded leaves and funnel-shaped blue flowers.

Ohlenschläger. See ŒHLEN-

SCHLÄGER.

Öhler, Gustav Friedrich (1812-72), German theologian, was appointed to the professorship of theology at Breslau. After seven years' tenure he resigned in 1852, in order to take charge of the theological college at Tübingen. Among his works are Prolegomena zur Theologie des Alten Testaments (1845), Veteris Testamenti Sententia de Rebus post Mortem Futuris (1846), Theologie des Alten Testaments (1873-74), and Lehrbuch der Symbolik (1876). See Knapp's G. F. Öhler (1876).

Ohligs, formerly MERSCHEID, tm., Rhine Province, Prussia, 10 m. s.E. of Düsseldorf, manufactures cutlery, silks, and bricks, and has iron foundries and flour mills, Pop. 20,682.

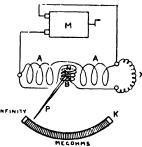
Ohm is the practical electric unit of resistance, and equals 10° C.G.S. electro-magnetic units of resistance. It is the resistance of a column of mercury, at 0° C., 106° 3 centimetres long and 14°4521 grammes mass. Symbol, Ror & In practice the resistance of a coil of wire of some alloy is used. For very accurate work corrections must be made for variation of resistance with temperature. Microhm, one million that ohm; megohm, one million ohms. See ELECTRICITY, CURRENT.

Ohm, GEORG SIMON (1787-1854), German physicist, born at Erlangen, became in 1833 director of the polytechnic school at Nuremberg, and in 1841 professor at Munich, occupying the ordinary chair of physics from 1852. He is celebrated for his discovery of the law in electricity known as 'Ohm's law.' His collected works were published at Leipzig (1892). See Mann's Georg Simon Ohm (1890). See also Ohm's LAW.

Ohmmeter, an instrument for measuring electrical resistances directly. It indicates the ratio of the potential difference at the ends of a conductor to the current passing through that conductor. It thus gives the resistance in

ohms for $\frac{\text{volts}}{\text{ampères}} = \text{ohms.}$ A A

are two fixed coils; B is a third fixed coil with its axis at right angles to that of AA. Inside B is a small needle N, pivoted, and carrying a pointer P, whose farther end moves over a grad-uated arc K. One set of coils acts as a current coil of low resistance, the other a pressure coil of high resistance measuring the E.M.F. If the coils AA were used alone, the needle would set with its axis parallel to that of AA. Similarly if B were used alone. But if both are used at the same time, then the axis of the needle takes up an inter-mediate position which depends upon the resultant of the effects produced by the magnetic fields due to the coils A A and the coil The strengths of these fields depend on the strengths of the currents passing through the respective coils, and in the pressure coil is proportional to the E.M.F. Frequently, as in insulation tests, a magneto-electric machine M is used for generating the necessary current. X is the unknown resistance. If this be very great, hardly any current



Evershed's Ohmmeter.

passes through B, and that passing through A keeps the pointer at the mark 'Infinity' on the scale. As X is decreased the current passing through B increases, and the pointer moves over the scale, which in many instruments is graduated after calibration on the inside in ohms, and on the outside in tenths of megohms (1,000,000 ohms = 1 megohm). By means of a switch the instrument is adjusted so that either of the scales may be used. The instrument shown is Evershed's ohmmeter.

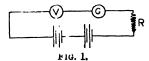
O.H.M.S., on His (or Her) Majesty's Service.

Ohm's Law, the most important law in electricity. Theoretically it defines resistance and conductance in terms of current strength and electro-motive force; practically it gives us a means of measuring electro-motive force in terms of current and resistance. Stated in its simplest form, the law is as follows.—The strength of the current in a circuit varies directly as the electro-motive force and inversely as the resistance (or

directly as the conductance) of the circuit. Algebraically this is expressed by the equation $c=\frac{E}{c}$.

or E = CR, where C is the current in ampères, E is the electro-motive force in volts, and R is the resistance in ohms.

In actual practice the application of the law is rarely so simple



as this statement of it might lead one to suppose. In any given circuit we have to deal, as a rule, with more than one resistance, and not unfrequently with more than one electro-motive force. Thus, if we take as our generator a battery of a dozen cells arranged in series driving a current through a voltameter V, a galvanometer G, and some resistance coils R (Fig. 1), we find that the current, beginning, say, at the right-hand zinc plate, encounters and overcomes the resistance of every cell in passing through the battery, and that it is then opposed successively by the resistances of the voltameter. the galvanometer, and the resistance coils before returning to the first zinc plate, and so complet-ing the circuit. The resistances of the connecting wires may, as a rule, be omitted. Further, each cell in the circuit is exerting independently its own electro-motive force. It is evident, therefore, that before the current can be determined, the total resistance and the total electro-motive force must first be ascertained. Hence the law becomes

C (ampères) =
$$\frac{\text{total } E \text{ (volts)}}{\text{total } R \text{ (ohms)}}$$

= $\frac{E_1 + E_2 + E_3 + \dots}{R_1 + R_2 + R_3 + \dots}$,

where E1, E2, E3, etc., are the several electro-motive forces in series, and R₁, R₂, R₃, etc., the several resistances. It may also happen that from some cause one or more of the cells is connected up the wrong way, so that it offers an opposing electro-motive force. Such an electro-motive force will require to be reckoned as negative in the algebraic sum. too, will the back electro-motive force induced by a motor in action, or that set up in an electrolytic cell or voltameter in which chemical decomposition is taking place, or that in the battery itself when polarization sets in. Having regard to these possible complications, the law may now be written :-

 $C = \frac{\text{total generating } E - \text{total opposing } E}{\text{total external } R + \text{total internal } R};$

or, calling the generating electromotive force E, the opposing electro-motive force c, the external resistance R, and the internal resistance r, $c = \frac{E - e}{R + r}$. Where there is no opposing electro-motive force this becomes $c = \frac{-}{R+r}$

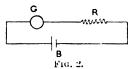
But Ohm's law is not only true of the circuit considered as a whole; it is also true of every part of it. When a battery is formed of a number of cells joined up in series, there is always a certain difference of potential between its terminals, the positive terminal being at the higher potential, and the negative at the lower. When these ter-minals are connected by a conductor, electricity flows from that at higher potential to that at lower potential, and any point in the connecting conductor is at a higher potential than any other point which is nearer the negative terminal. It follows that, any two points in a circuit being taken, there is between them a certain potential difference which represents the electro-motive force required to drive the current through the intervening part of the circuit. Suppose a voltmeter, or instrument for measuring po-tential differences, to be placed across the terminals of a conductor of known resistance in which a current of known strength is flowing. It will be found that the potential difference or drop in volts registered by the voltmeter is equal to the product of the current multiplied by the resistance of the conductor. In other words, for this part of the circuit E = CR, and Ohm's law circuit E=CR, and Ohm's law holds true. Thus, if a carbon incandescent lamp, offering a resistance of 250 ohms, be placed across two main leads kept at a permanent potential difference of 100 volts, the current taken by the lamp will be found to be 4 ampères. For $c = \frac{E}{R} = \frac{100}{2550} = 4$ ampères. And every similar lamp

put into circuit in parallel with the first will take an equal current.

The liquid in the battery and the coils in the armature of a motor or dynamo are no less conductors than the external wires, and as such offer resistance to the passage of the current. A certain proportion of the total electro-motive force, depending in amount upon the ratio of the internal to the external resistance, is used up in forcing the current through these. Hence the potential difference between the terminals of a generator, which represents the electro-motive force available in the external circuit, is always less than the total electro-motive

force produced by the generator, by the number of volts required to overcome the internal resistance. These latter are known as the 'lost volts.' From the equation $C = \frac{E}{R+r}$ we deduce E = C(R+r) = CR + Cr, in which Cr represents the 'lost volts.' Obviously these are directly proportional to the internal resistance r.

Resistances in Series and in Parallel.—In the typical circuit shown in the diagram the resistances include that of the galva-nometer G, that of the resistance coils R, and that of the battery B. These are all arranged in series. When this is the case the total resistance is equal to the sum of the



separate resistances—i.c. $R = r_1$ $+r_2+r_3+\ldots$, where R is the total resistance, and r_1 , r_2 , r_3 , etc., the separate component resistances. Hence in the case before us the total resistance = R + B + G. If a number of conductors be arranged in parallel, it is found that the joint conductance is equal to the sum of the separate conductances—i.e. the reciprocal of the total resistance is equal to the sum of sistance is equal to the sum of the reciprocals of the separate resistances. Algebraically this gives $\frac{1}{R} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3} + \dots$ This important formula may be proved thus:-Let x and Y be two conductors arranged in parallel, their

resistances being r_1 and r_2 respectively, and the current in the respective branches being c_1 and c_2 . Let V₁ be the potential at point A, where the current enters the arrangement, and ∇_2 the potential at point B, where it leaves; and let R be the total resistance of the combination, and C the total current. Then v1 - v2 represents the drop in volts between A and B. Therefore $c_1 = \frac{v_1 - v_2}{r_1}$, $c_{2} = \frac{V_{1} - V_{2}}{r_{2}}, \text{ and } c = \frac{V_{1} - V_{2}}{R}. \text{ But}$ $c = c_{1} + c_{2}. \text{ Therefore } \frac{V_{1} - V_{2}}{R}$ $= \frac{V_{1} - V_{2}}{r_{1}} + \frac{V_{1} - V_{2}}{r_{2}}; \text{ therefore } \frac{1}{R}$ $= \frac{1}{r_{1}} + \frac{1}{r_{2}}. \text{ therefore } R = \frac{r_{1} \cdot r_{2}}{r_{1} + r_{2}}.$

While this formula is perfectly general, and holds good for any number of conductors in parallel, it is especially valuable in the case shown—that, namely, of two conductors. In this instance it is found that when the current divides into two parts, as at A (see diagram above), the strength of the current in each branch is inversely proportional to the resistance in that branch - i.e. $\frac{c_1}{c_2} = \frac{r_2}{r_1}$. Each of the branches may be spoken of as a shunt to the other. Now, in working with delicate instruments it is generally undesirable to pass more than a very feeble current through the instrument, lest damage should result. This is effected by placing a wire as a shunt across the terminals of the instrument. (See Shunt.) Part only of the current then goes through the instrument, and part through the wire. By this formula for conductors in parallel it is possible to calculate the resistance that must be offered by the shunt so as to restrict the current passing through the instrument to any required fraction of the original current.

Cells in Series and in Parallel. -Just as resistances may be arranged in series or in parallel, or in any combination of both, so cells may be similarly arranged with varying effects on the total electro-motive force and internal resistance. Let n similar cells be arranged in series-i.e. the positive plate of the first united to the negative of the second, and so on—and it is obvious that if the potential difference between the plates in each cell be E, the potential difference between the two extremes is nE, which is the electro-motive force of the battery. But since the whole current traverses each cell, the internal resistance of the battery is nr, r being the internal resistance of each cell. Hence for a battery of n cells in series Ohm's law

becomes nE = C(R + nr). When n similar cells are arranged in parallel-i.e. with all the positive plates joined to-gether, and all the negative plates joined together—the effect is practically to make only one large cell with plates n times the size of the original plates, and with the same distance between the plates as in the individual cell. But the electromotive force of a cell depends only on the substances used, and is independent of the size of plates. Hence in this case the E.M.F. of the whole battery is the same as the E.M.F. of a single cell. The internal resistance of

the battery, however, is only $\frac{1}{n}$

that of the individual cell, since its plates are n times larger. Whence it follows that Ohm's law for n cells in parallel becomes $\mathbf{E} = \mathbf{C} \left(\mathbf{R} + \frac{r}{n} \right)$. And in general, if pq cells be arranged in p rows, q abreast—i.e. p in series and q in parallel—we have $p\mathbf{E} = \mathbf{C} \left(\mathbf{R} + \frac{pr}{q} \right)$.

parallel—we have $p\mathbf{E} = \mathbf{C}\left(\mathbf{R} + \frac{pr}{q}\right)$.

Best Grouping of Cells.—When the external resistance is very large compared with the internal resistance, the cells must be arranged in series. For if R is the large external resistance and r the small internal resistance, we have, for n cells of electro-motive force $\mathbf{E}, \mathbf{C} = \frac{n\mathbf{E}}{\mathbf{R} + nr}$. But nr being very small, $\mathbf{R} + nr$ is practically = R. Therefore in this case $\mathbf{C} = \frac{n\mathbf{E}}{\mathbf{R}} = n$ times the current got from one cell. Now if the cells had been grouped abreast, we should have had $\mathbf{C} = \frac{\mathbf{E}}{\mathbf{R} + \frac{r}{n}} = \frac{\mathbf{E}}{\mathbf{R}}$.

 $\frac{r}{n}$ being negligible, = the current got from only one cell.

When the external resistance is very small compared with the internal resistance, cells should be arranged in parallel to give the strongest current. Then we have,

arrangest current. Then we have, for n cells as before, $C = \frac{E}{R + \frac{r}{n}}$

But $R + \frac{r}{n} = \frac{r}{n}$, R being negligible.

Therefore $c = \frac{nE}{r} = n$ times the current got from one cell. Arranged in series, the battery would give $c = \frac{nE}{R+nr} = \frac{E}{r} =$ the current got from one cell alone.

In general, it can be shown that a number of cells give their maximum current when so arranged that the internal resistance of the battery equals the external resistance of the circuit. But this arrangement, though productive of the greatest current, is not the most economical. The amount of heat developed in the battery is, under these conditions, exactly equal to that developed in the external circuit, and half of the energy of the current is therefore For economical working, the feebler the current the better. so long as it is capable of accomplishing the end in view. The general principles here set forth as applying to cells apply with equal force to any generators whatever.

Ohnet, GEORGES (1848), French novelist, born in Paris; devoted himself to the production of the romances of social life which, under the general title of Les Batailles de la Vie, have attained wide popularity. His works, which are melodramatic in manner and optimistic in tone, include Serge Panine (1881), Le Mattre de Forges (1882), La Comtesse Sarah (1883), Volonté (1889), Le Docteur Rameau (1889), Nimrod et Cie (1893), and La Dame en Gris (1895). Some of his novels have been dramatized with Success.

Ohrwalder, FATHER (c. 1855), missionary, was one of the founders of the Austrian mission station at Delen in Kordofan, Central Africa, in 1881. In 1882 he and his companions were taken prisoners by the followers of the Mahdi, but escaped in 1891. See Ohrwalder's Ten Years' Captivity in the Mahdi's Camp (1892).

Oidium, a name given to a certain stage in the development of various fungi of the mildew class. In this stage the fungi consist of a network of microscopic filaments, the total effect of which is to give the appearance of a white coating over the surface infested. Each filament consists of a row of cells, the terminal ones breaking off after a certain time as reproductive conidia. Some of the filaments pierce the cell-walls of the host plant on which the fungi live, while others project vertically into the air. Among the species are Erysiphe graminis, which attacks grass leaves; E. Martii, attacking peas; Oidium balsamii, parasitic on turnips; O. Tuckeri, which injures the grape vine; and Sphærocheca Castagnei, one of the enemies of the hop plant. The treatment consists in thoroughly dusting the affected plant with flowers of sulphur, or in applying a weak solution of sul-phide of potash.

Oil and Petrol Engines. The principle of action in an ordinary oil or petroleum engine is practically the same as in a gasengine, except that the motive power is obtained from the combustion of a mixture of oil vapour and air instead of gas and air. In most oil-engines the Otto or fourstroke cycle is adopted. During a suction stroke a charge of oil vapour and air is drawn into the motor cylinder; on the return stroke this mixture is compressed and ignited at the commencement of the second forward or working stroke, the products of combus-tion being discharged during the second return or exhaust stroke. Oil-engines have been designed to work with a two-stroke cycle, but they are not so common as the four-stroke cycle type. Petro-leum, when heated to a certain temperature, gives off inflammable vapour; this temperature—termed the flash point'—depends upon the density of the petroleum. In Great Britain, petroleum is legally considered to be safe if its flash point is above 73° F. Oils having a flash point above 73° F. constitute the fuel in the ordinary type of oil-engine, in which a vaportzer is provided for vaporizing the oil by the heat from a lamp or from the combustion in the engine. In petrol-engines using petroleum spirit or light oils, the vaporizer is generally called a carburettor, and the oil or spirit is easily vaporized by merely drawing warm air through it. In most engines the vaporizer consists of a small vessel heated externally by means of a lamp; the oil, in small quantities at a time, is allowed to enter this vessel either with or without air, and is immediately vaporized on coming into contact with the heated surfaces. In a few engines the vaporizer forms what is practically a prolongation of the cylinder itself, and after a pre-liminary external heating, is kept sufficiently hot, by the compression of the charge and its combustion, to vaporize the oil.

The oil vapour is admitted through an inlet valve, which is usually mechanically operated; a second or air valve opens automatically during the suction stroke, to allow the proper amount of air to enter the cylinder; and a third or exhaust valve is opened during the exhaust stroke, to permit the discharge of the products of combustion. In some oil-engines one valve serves both as inlet and air valve. The valves are all of the mushroom type. The governing in almost every case is on the 'hitand-miss' principle, in which a charge of oil vapour is not allowed to enter the cylinder should the speed of the engine exceed the normal rate; thus an explosion, and consequently a working stroke, is omitted.

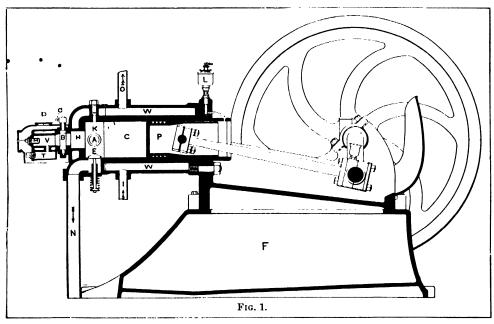
Four-stroke Cycle Engine.—A

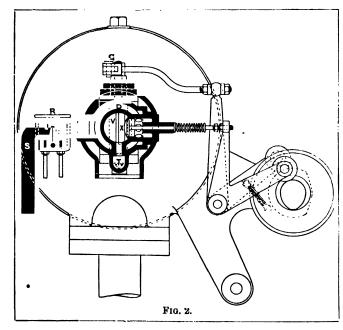
Four-stroke Cycle Engine.—A good example of an engine working on the Otto cycle is shown in Fig. 1, which represents a sectional side elevation of a 'Blackstone' oil-engine. A sectional end view is shown in Fig. 2, and Fig. 3 is a horizontal section through the timing valve. The cylinder C is surrounded by a water chamber or jacket w, through which a constant supply of water must circulate in order to keep down the temperature of the cylinder; the water enters at I and leaves by the pipe 0. The piston P is of the trunk form; A is the main air valve, and E the exhaust valve. When the piston is about to begin either a suction or a working stroke, there is a space K between it and the end of the cylinder, into which the explosive mixture of oil vapour and air is compressed before firing.

This space is called the combustion chamber, and its volume is

space the greater will be the pressure at the end of compres-

far, there is a danger of the charge igniting prematurely, owing to the





about thirty per cent. of the volume displaced by the piston at each stroke. The smaller this

sion. The efficiency of an oilengine increases with the degree of compression, but if carried too

heat produced by the compression. An ignition chamber v is connected with the combustion chamber by a passage H, into which a cylindrical timing valve B is introduced. This valve is kept closed during the compression stroke, so as to separate the above two chambers at this period of the cycle. At the proper moment the timing valve is partially rotated by a crank G; the charge then enters the ignition chamber and explodes, producing the working stroke of the engine. The oil is pumped from a tank F, forming the bed of the engine.

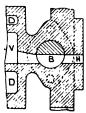


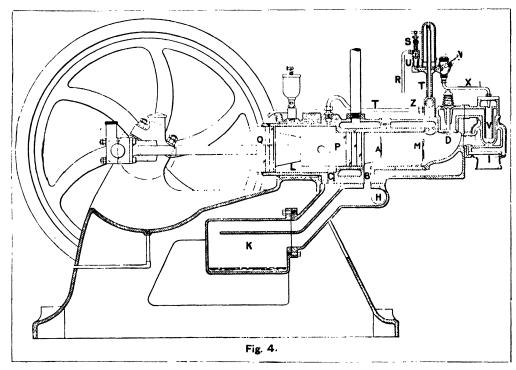
Fig. 3.

into an oil chamber R, the object of which is to keep the oil at a constant level in a nipple J, projecting into an air pipe S, which leads into an annular vaporizing chamber D. During the suction stroke oil is drawn into the vaporizer through the nipple by the

inrushing current of air; the oil then becomes vaporized, and passes through a vapour valve x into the cylinder, where it is mixed with a sufficient quantity of pure air, which enters through the air valve A, to form an explosive mixture. Then the backward stroke of the piston compresses the charge into the combustion chamber K. As the crank passes the in-dead centre the timing valve opens to allow the charge to pass into the ignition chamber, where it comes in contact with the heated tube at and explodes, producing the working stroke. When starting

is that an impulse is given at each revolution. Fig. 5 is a cross section through the side passage A. It will be noticed that there is a second cylinder L in front of the working cylinder M; this front cylinder acts as an air-pump, and at the proper moment aspirates the waste gases from the working cylinder, thus avoiding the necessity of having an exhaust stroke. Assuming the piston P to be at its complete in-stroke, and a charge compressed to about 40 lbs. per sq. in., this is fired by a hot tube in the usual manner; the working stroke is then commenced. When the piston reaches and

D; the air pipe, which is provided with a simple arrangement for regulating the supply of air, is placed at the back of the cylinder, and is not shown in the drawing. On the return stroke the products of combustion in the condenser K are displaced through a valve H into the exhaust pipe E. The lower part of the condenser is preferably covered to a depth of half an inch with water; this cools the products of combustion drawn from the working cylinder, and keeps the piston within the temperature limits required for successful working. A vessel N is connected by a pipe T with



the engine, the vaporizer and an igniting chamber T are, heated by a lamp for about six minutes. The flywheel is then turned forward by hand to obtain the first explosion, after which the engine works automatically. The speed of this engine is regulated by means of a direct-acting shaft governor on the end of the side shaft; the governor determines the opening of the vapour valve X.

Two-cycle Engine.—Some very important and novel features are embodied in the engine illustrated in Fig. 4, which represents a sectional side elevation of the Gothic two-cycle oil-engine (Melhuish's patent). The distinctive feature

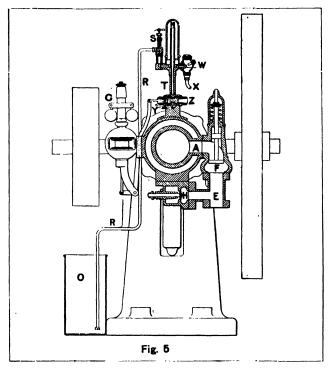
uncovers a port A, some of the products of combustion pass out through a check valve r (shown in the cross section), thus reducing the pressure in the cylinder M to that of the atmosphere. At the same time the larger piston Q has been creating a partial vacuum in a vessel K, termed a condenser; and as soon as the continued outward movement of the piston P uncovers an exhaust passage B, any remaining products of combustion in the working cylinder are drawn into the condenser K and vacuum cylinder L. The new charge of oil vapour and air thereupon flows into the working cylinder through an inlet valve

the vacuum cylinder L, and by a regulating cock S and pipe R with the oil-container O (this may form part of the bed of the engine). On the other side of the vessel N there is a non-return delivery valve W and pipe X leading into the vaporizer V. The partial vacuum formed at every out-stroke lifts a definite quantity (regulated by the cock S) of oil into a small cavity at the base of the vessel N, the oil being visible as it feeds through a glass tube U. On the return stroke the pressure exerted by the pump piston Q drives the oil through the valve W into the vaporizer. Another very important action takes place in this

engine. The heat from the products of combustion drawn into the condenser K converts some of its contained water into vapour or very wet steam, some of which is forced into the vessel N, to be there condensed into water, and, along with the oil, eventually passes into the vaporizer. The introduction of a small quantity of water into the working cylinder appears to have the effect of increasing the efficiency of the engine. The governing is effected by a centrifugal belt-driven governor G, which acts through a bell crank lever and link on a plunger z; this plunger, by its

sumption of oil being about half a pint per B.H.P. per hour. The ignition tube and vaporizer are heated by means of a lamp placed underneath. Two-stroke cycle engines are generally considered to give a more uniform turning effort on the crank shaft than an Otto or four-stroke cycle engine. There are no side shaft, gearing, rocking levers, or cams in this engine, which is also arranged to work as a gas-engine using ordinary town or producer gas.

Diesel Oil-engine.—A longitudinal section of this engine is shown in Fig. 6, and a transverse section in Fig. 7. The engine, as



movement to and from, opens and closes communication between the vessel N and the pump cylinder L, thereby shutting out the action of the pump and stopping the supply of oil. Should the strap driving the governor break, the plunger moves out, and, by preventing the flow of oil, stops the engine. A stepped catch Y holds the plunger at starting the engine, and, when the normal speed is obtained, automatically falls and leaves the governor free to act. The Gothic engine works with almost any kind of oil, preferably Russian petroleum with a specific gravity of about 0'82, the con-

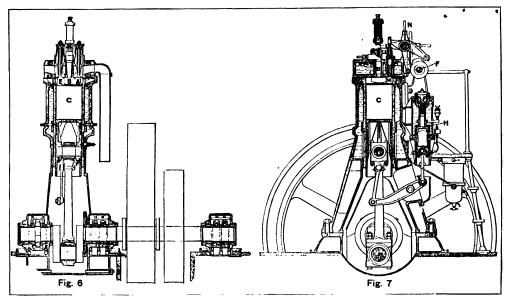
here illustrated, is of the vertical type, and operates on the four-stroke cycle, one stroke in every four being a power stroke. The working cycle is as follows:—(1.) On the first down-stroke of the piston, air is drawn direct from the atmosphere through an air valve A into the cylinder c. (2.) On the first up-stroke this air is compressed to a pressure of about 40 atmospheres, which raises its temperature sufficiently (about 1,000° F.) to ignite the fuel oil when this is admitted through a valve B. (3.) At the point of maximum compression, and during the first period of the next down-stroke, fuel oil is blown into

the cylinder by compressed air at a pressure of about 100 lbs. per sq. in. above the pressure in the working cylinder. The amount of oil thus sent into the cylinder is determined by the governor, to suit the variations in the load. (4.)On the next up-stroke the products of combustion are expelled to the atmosphere through an exhaust valve E. No vaporizer or igniting device is required on this engine; the oil, being injected gradually into the air (heated by compression) as mist or spray, burns quietly at nearly constant pressure, so that no explosion takes place. There are four valves arranged in the cylinder cover; each valve has a separate seat, which can be removed without displacing the valve driving gear or lifting the cylinder cover. The valves are mechanically operated by the action of the bent rocking levers seen in Fig. 7; the movements of the levers are determined by cams fixed upon a horizontal shaft r, running at half the speed of the engine shaft. The quantity of oil required is delivered by a small pump—driven from the cam shaft—into the fuel valve casing the shaft in the fuel valve casing the shaft in ing, and then blown into the working cylinder in the form of a fine spray by compressed air. The compressed air is supplied by a two-stage air compressor H, arranged on the frame of the engine; the compressed air is stored in steel reservoirs or cylinders, from which it is drawn as required. For starting the engine, compressed air from the reservoirs is admitted through a valve M. which is operated by a cam and rocking lever in the same manner as the other valves. The lever working the valve M is only thrown into action when the engine is to be started; after five or six revolutions and the engine is in full operation the lever is put out of contact with its cam by a handle N. It will be noticed that there are two pistons in the air-compressor, and the air is passed through a cooler between the two compressor cylinders. Almost all classes of cheap mineral oil, especially crude petroleum, crude naphtha, and shale oil (sp. gr. about 0'92), also ordinary household lamp petroleum (sp. gr. 0'82), can be used in this engine. The oil (crude Texas petroleum) consumption per brake horse-power hour at full load is 0'46 lb. for a 40 B.H.P. engine, and 0'41 lb. for a 100 B.H.P. engine. This, with oil at 41s. per ton, is equal to one-tenth and one-eleventh of a penny per brake horse - power hour. Not only is this engine economical at full load, but its economy is relatively great at partial loads; hence the Diesel engine is particularly suitable for a load of a variable character. The Campbell Oil-engine. — In

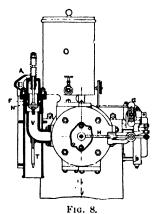
The Campbell Oil-engine. — In this engine only one valve is used to admit both oil vapour and air. An end view of the cylinder, with a section through the vaporizer, is shown in Fig. 8. The oil, which

iron chamber bolted to the cylinder, and in direct communication with the combustion chamber c. The ignition tube T is screwed into the lower portion of the vaporizer; and this tube, together with the whole of the vaporizer, is heated by an ex-

purpose; in fact, if air which has been slightly warmed be passed over petrol, it becomes charged with the vapour. The apparatus for effecting this is called a carburettor, and corresponds to the vaporizer of the oil-engine. A typical example



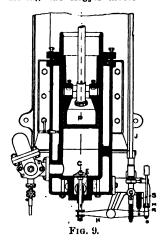
is contained in a cistern O placed on the top of the cylinder, is admitted through an annular space or groove F, and flows into the vaporizer V through oil-inlet holes N in the valve seat when the



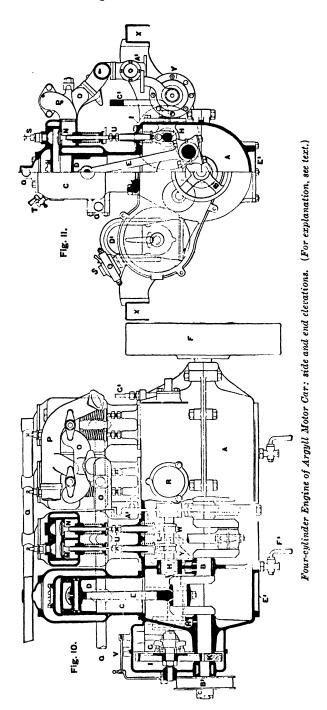
inlet valve B is forced down by the pressure of the atmosphere during the suction stroke of the engine; A is the air-inlet passage. The vaporizer consists of a castternal lamp. A horizontal section of part of the cylinder is shown in Fig. 9. The exhaust valve E is operated through a lever H and side rod J, which makes one stroke for every two strokes of the engine piston; the exhaust valve is held in position on its seat by means of a spring S. This engine is practically governed through the exhaust valve. When the speed exceeds the normal, a centrifugal governor G pushes down a steel piece M, which engages with a corresponding steel piece R on the lever H, and prevents the exhaust valve from closing.

Petrol-engines.—While there are a great many types of these engines, the principle of action is practically the same in all, the chief difference being in details of construction. With very few exceptions, the four-stroke cycle is adopted; and the method of working is just the same as in any ordinary gas or oil engine, except that petrol or petroleum spirit of a specific gravity 0'66 to 0'72 is used instead of the heavier oils. As already pointed out, these low-density oils give off inflammable vapour at comparatively low temperatures, and thus very little heat is required for this

of a petrol engine is shown in the following illustrations of a four-cylinder engine, as used for driving the Argyll motor car.



A side elevation of the engine is shown in Fig. 10, sections being taken through a cylinder and one set of valves respectively. The other view (Fig. 11) is an end



elevation, the right-hand side of which is a section taken through one of the cylinders and its exhaust valve. The cylinders are 95 mm. (3'74 in.) bore and 130 mm. (5'12 in.) stroke. This engine is capable of developing 24 B.H.P. at a speed of 1,100 revolutions per minute. Each cylinder is provided with an inlet valve M and an exhaust valve N, held down on their seats by means of springs, and operated mechanically from a cam shaft H, which is driven by two-to-one gearing K and I. The explosive mixture of petrol vapour and air is distributed to the four cylinders through an inlet pipe O, which communicates with the carburettor (Fig. 12), r is the exhaust pipe. The cylinders and the valve casings are water-jacketed; the pipe connections for this purpose are indicated at Q. This engine works on the Otto cycle, and there are two explosions every revolution. A centrifugal governor G, acting through lever V, controls the speed of the engine by means of delicately - balanced doublethrottle valve A' in the inlet pipe o. The ignition in petrol-engines is now entirely effected electrically, and the necessary current is obtained either from charged accumulators, or (as in the engine illustrated) from a magneto machine D', driven by gearing from the crank shaft. At the right moment, which is determined by a commutator J, a spark passes between two metal points fixed in a sparking plug s, and the charge is ignited; the commutator is driven by the same gearing as the magneto machine.

Carburettor.—A vertical section through Smith's carburettor and governor, as used on the Argyll car, is shown in Fig. 12. Petrol flows in from the supply tank through a pipe (6), and is filtered by passing upwards through a strainer (7). An arrangement of float (11) and needle valve (8) is employed to keep the petrol at the level of the dotted line in the feed chamber (3). As the petrol is withdrawn, the float descends and presses down the levers (10), which lift the valve and allow more petrol to enter the feed chamber; a weight (9) brings the valve back again on to its seat when the float levers are released. The suction stroke of the motor piston creates a partial vacuum in the induction pipes (41) leading to the cylinders, one pipe serving a pair of cylinders in a four-cylinder engine; and a charge of petrol is pumped out of the feed chamber by the motion of a plunger (14), which is lifted by a disc (18) when there is a difference of pressure of air on its two sides. The petrol is sprayed into a cham-

ber (5), where it is mixed with hot air which enters through ports (19) communicating with an inlet pipe (23). The amount of the displacement of the pump plunger, and consequently the quantity of petrol discharged into the mixing-chamber, is adjusted by cams (21) on a spindle (22). At the mouth of each induction pipe there is placed a separate governing device in the form of a disc valve (31), which is held from its seat by springs (33 and 36). During a suction stroke, if, owing to the increased speed of

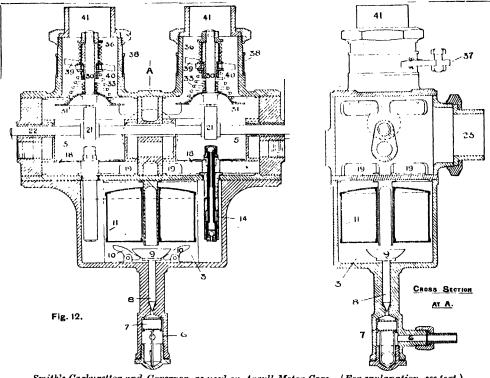
supply of air charged with petrol vapour. The degree of lift of this valve determines the speed of the The lift may be varied engine. through a lever on the steering wheel of the car, operating a lever (37) connected to a sleeve (38). This sleeve carries a pin which passes through a spiral-shaped slot (39), and engages with a groove in a collar (40) on the valve stem (30). A movement of the control lever therefore changes the amount by which the valve can open, and, in consequence, the speed of the engine

and tide. Marine motors are provided with either a reversing propeller or a reversing gear on

the main shaft.

the main shaft.
See Robinson, Gas and Petroleum Engines (2nd ed. 1902); Clerk, The Gas and Oil Engine (8th ed. 1899); Grover, Modern Gas and Oil Engines (3rd ed. 1902); Rankin Kennedy, Modern Engines and Power Generators (1904-5); and Donkin, Gas, Oil, and Petrol Engines (4th ed. (1905).
Oil-beetle, a term applied to

Oil-beetle, a term applied to the members of the genus Meloë, or used generally as a synonym



Smith's Carburettor and Governor, as used on Argyll Motor Cars. (For explanation, see text.)

the piston, the difference of pressure on the two sides of the valve (31) is sufficient to overcome its inertia and counterbalance the pressure of the springs tending to keep it open, it will close on its seat, cutting off the supply of air and petrol. Once it has closed it cannot open again during the suction stroke, as the further movement forward of the piston in the cylinder only tends to increase the vacuum and hold the valve more tightly shut. When the speed at which the governor is to act is not exceeded, the valve (31) never closes, and the motor piston draws in its full

at which the governor will begin to act. The levers (37) on each governor are coupled to a common rod, so that each engine is cut out at the same speed.

Marine Engines. - Vertical engines with one or more cylinders, and using ordinary petro-leum or petrol, are now being largely used for boat propulsion. The principle of action is practically the same as in the various engines already described. The marine oil-engine, as adopted in fishing boats normally fitted with sails, is found to be most useful, as it enables the boats to be independent to a large extent of wind

for the blister beetles or Cantharide. See CANTHARIDES.

Oil-bird. See GUACHARO. Oil Cake, the residues of linseed and cotton-seed after the oil has been extracted at a high pressure. The cakes are corrugated in appearance, and bear the impress of the canvas bags into which the oleaginous meals are placed before the pressure is applied. They contain a considerable percentage of oil, and an excess of albuminoids, mucilage, and husk, and are of high feeding and manurial value. Similar cakes are rape cake, hemp-seed cake, beech-mast cake, gold-of-pleasure cake, earth-nut cake, palm-nut cake, sunflower-seed cake, cocoanut cake, candle-nut cake, seamina cake, pumpkin-seed cake, and others. Probably decorticated cotton cake is the best of all the cakes for combined feeding and manurial value. It is, however, scarcely so digestible as linseed cake, and hence the latter is the most popular among shepherds and stock-men generally.

Oil City, city, Venango co., Pennsylvania, U.S.A., in the oil region, on the Allegheny R., 70 m. N. of Pittsburg. Has petroleum refineries, foundries, and machine shops. Pop. (1900) 13,264. Oilcloth. See LINOLEUM.

Oll-loth. See LINOLEUM.
Oll-fish, or GOLOMYNKA (Comephorus baikalensis), a curious
bony fish, in regard to whose
systematic position considerable
doubt exists. It seems to be confined to Lake Baikal. The pectoral fins reach a large size, and
the fish takes flying leaps out of
the water, after the fashion of
the flying fish. The body is naked
and of a greenish tint, and
yields oil.

Oil Fuel. See FUELS.

Oil Gas is the complex mixture of hydrocarbons obtained by subjecting oils to a high temperature (cf. gases), and is largely used in a compressed state for lighting in places where the connection with the supply can only be intermittent, as in trains and buoys. See Gas Manufacture, Fuels.

Oil of Vitriol. See Sulphuric Acid.

Oils, ESSENTIAL. See ESSEN-TIAL OILS, PERFUMERY.

Oils and Fats are, in general, either hydrocarbons, as in the mineral oils, or the glycerol esters of fatty and unsaturated acids, as in animal and vegetable oils. The oils are characterized by being colourless to yellow, not miscible with water and of lower specific gravity. Fats and greases are solid oils, the difference being usually merely de-nendent on temperature. The pendent on temperature. essential oils, such as oil of winter-green, cassia, and eucalyptus, occurring in many plants and possessing characteristic odours, are not oils in the strict sense of the word, and will not be here considered—the true oils being classed as (1) fatty oils, and (2) hydrocarbon oils.

1. The fatty oils are obtained from the seeds and fruits of plants by subjecting them to pressure, as in the case of the olive, rape seed, linseed, and cotton seed; or by extracting the oil by volatile solvents, such as ether and petroleum spirit. The fatty portions of animals also yield oils and fats. Fatty oils, when subjected to the action

of superheated steam, undergo decomposition into glycerol and one or more acid bodies belonging to the fatty or unsaturated series. As all these oils yield glycerol, they are often called glycerides. Certain of the acids, such as oleic acid and stearic acid, are common to many oils; while others, such as arachidic acid, ricinoleic acid, and linolic acid, are characteristic of only one or a few. The fatty acids may be divided into four groupsthe stearic series, the oleic series, the linolic series, and the rici-noleic series. All are soluble in alcohol, ether, benzene, and, with the exception of the last-named series, in petroleum spirit. The fatty oils are only slightly soluble in alcohol, with the exception of castor oil, which easily dis-solves. They are readily soluble in ether, benzene, chloroform, carbon bisulphide, and, with the exception of castor oil, in petro-leum spirit and oil. Their specific gravity varies from 0'880 in the case of sperm oil to 0.964 in the case of castor oil. Some of the fatty oils, linseed oil in particular, when exposed to the air in thin films, absorb oxygen, and These oils are become hard. called drying oils, and are valuable for painting. Other oils, such as olive oil, do not dry, but at most become a little more viscid. These are called non-drying oils, and are used for lubricating machinery. There are cating machinery. There are other oils intermediate in properties between these two and called semi-drying oils. The following are the more important fatty oils of the three groups:—Drying Oils.—Linseed, hemp, walnut, poppy-seed, sunflower, fir-seed, Chinese-wood, and menhaden oils. Semi-drying Oils. - Niger-seed. cameline, maize, kapok, cottonseed, sesame, rape, colza, mustard, croton, castor, and grape-seed oils. Non-drying Oils.—Olive, groundnut, apricot, almond, ben, sperm, cod-liver, whale, seal, porpoise, neatsfoot, laurel, palm, cocoanut, butter, lard, and tallow. One of the most important properties of all the fatty oils is that, when boiled with either caustic soda or potash, they undergo what is called saponification, glycerol is set free, and the alkali combines with the acids of the oil and forms a soap. (See SOAP.) Butter is used almost exclusively as a food, as are also the better grades of olive, cotton, groundnut, cocoanut, and sesame oils; while the lower grades are used for making soaps. Lard is used as a food fat, and also in soap-making. Sperm and colza oils are burned in lamps. Palm oil and tallow are largely used in making soaps and candles, whilst the finer grades of castor,

almond, cocoanut, and cocoabutter oils are used in medicine. 2. Hydrocarbon oils, have only been known during the last half-century, are derived from (1) the oil shales of Scot-land, France, New South Wales, and (2) from the petroleum of America, Russia, Germany, Bur-ma and other countries. These ma, and other countries. oils appear in commerce in a variety of forms, viz.—(1.) As limpid, colourless liquids, very volatile and inflammable, of specific gravity '70-'76, and generally known as naphthas, benzine or benzoline, being largely used in paint and varnish-making, oil and fat extraction, dry cleaning of garments, and as fuel for in-ternal-combustion motors. (2.) Water-white limpid liquids, not very volatile, of a specific gravity ranging from 0.790 to 0.820, and used as burning oils in lamps. These are called paraffin, petro-leum, and kerosene. (3.) Yellowcoloured oils of a specific gravity ranging from 0.865 to 0.915, and more or less viscid, which are extensively used for lubricating machinery. (4.) Viscous and in some cases buttery products, varying in colour from a dark amber to a deep brown. These are used for lubricating the cylinders of steam and gas engines. for which purpose they are superior to any other oils; vaseline, of value in pharmaceutical work, belongs to this type of oils. All these bodies agree in being more or less complex mixtures of hydrocarbons, and as a class are found to be neutral and inert. They are not acted upon by even the strongest acids and alkalis at the ordinary temperature, and only by acids at higher temperatures to a limited extent. hydrocarbons of which they are composed can be divided into three groups—(1) paraffins, (2) olefins, and (3) naphthenes. The first series (see PARAFFIN) are most characteristic of the products derived by distillation from Scottish shale. The olefin series, which are not so well known, are very similar to the paraffins, but are unsaturated, whilst the liquid members are somewhat more oily in appearance; they are found in fairly large quantities in American and other petroleums. The naphthenes, as a rule, are more viscous than either the paraffins or olefins, and are characteristic of Russian petroleum and of the oils which can be obtained from resin by distillation. See Hurst's Lubricating Oils, Fats, and Greases (2nd ed. 1902); Redwood's Petroleum and its Products (1896); Lewkowitsch's Chemical Technology and Analysis of Oils, Fats, and Waxes (3rd ed. 1904); and Allen's Commercial

Organic Analysis (3rd ed. 1899).

Oil Vessels, for transporting oil, contain long, narrow trunks or deep hatchways throughout the ship, which, being only partially filled, leave room for expansion, and having compara-tively small free surface, do not affect the stability to a very great extent. As petroleum is capable of leaking through joints which are ordinarily watertight, the caulking and riveting of these vessels require special care, and the rivets are more closely spaced than in ordinary watertight work. The propelling machinery is placed at the extreme after-end of the vessel, and is separated from the oil compartments by a cofferdam consisting of two bulkheads a frame space apart. Into this space any leakage of oil passes. In many cases the cofferdam space is kept full of water, which is pumped to a height above the sea-level. The leakage of oil then floats to the surface, and so runs overboard through the scuppers.

Ointments are formed of greasy substances, animal or vegetable fats, etc., with which are mixed various drugs for the purpose of external application. They may be used merely for their healing, softening, or irritating effect upon the skin; or by their use a drug such as mercury may be passed into the circulation.

Oise. (1.) Department of N. France, occupying both sides of the Oise, N. of Paris. The surface is gently rolling, and diversified with forests, and the soil fertile. The region is essentially agricultural, raising the usual grain crops, but particularly vegetables. The department possesses manufactures of iron and agricultural implements, porcelain, fancy checks, lace, and glass. Area, 2,272 sq. m. Pop. (1901) 407,808. Beauvais is the capital. (2.) River, r. b. trib. of the Scinc; rises in the Belgian Ardennes. Length, 186 m. It is navigable, by means of lateral canals, to Chauny, 21 m. N.w. of Laon.

Ojibways, or Chippeways, N. American aborigines, a branch of the Algonquin family dominant in Michigan and Upper Canada; form, with the neighbouring Crees and Montagnais of Labrador, a special division to which Schoolcraft has given the name of 'Nipercinean.' All have given up the nomad life, and many have formed agricultural settlements in Manitoba, Ontario, and other parts; while the majority have been removed to Kanas, Minnesota, Wisconsin, Michigan, and N. Dakota. In 1900 the Ojibways, with the associated Munsees and Pottawatomics, numbered nearly 32,000, about equally distributed between Canada and the United States.

Oka, river of Central Russia, affluent of the Volga, has its source in Orel gov. At Orel it becomes navigable for barges and light craft. From Orel it takes a mainly northward direction, through Tula and Kaluga governments. Then turning abruptly eastward to Kaluga city, it flows past Kolomna and Ryazan; and then N.E. to its junction with the Volga at Nijni-Novgorod. It is about 900 m. long; its basin has an area of 120,000 sq. m.



Okavi.

Okapi (Ocapia Johnstoni), a mammal related to the giraffe, discovered by Sir Harry Johnston in the Semliki forest, protectorate of Uganda, E. Africa, in 1901. It is an animal resembling an antelope in appearance, differing from the giraffe in its smaller size, shorter limbs, short neck, and type of coloration. The fore limbs appear to be about the same length as the hind. Sir Harry Johnston's specimen also differed from the giraffe in the complete absence of horns; but two skulls subsequently obtained of male and female animals both possessed horns. It has, however, been suggested that there may be more than one species of okapi. In the horned specimens the horns are very small, and completely covered with skin (cf. giraffe) in the female; in the male, on the other hand, they are larger, and are capped with a small polished epiphysis, which seems to have projected through the skin. The projected through the skin. The ears are unusually large. The head is pale fawn colour, the neck and body dark purplish brown, and the thighs and legs white, with black bars. Like the giraffe, the okapi has only two toes on each foot, and its teeth generally resemble those of the

giraffe. It is probable, indeed, that the okapi, together with certain fossil forms, represents the stock from which the giraffe arose. So far as is known, the okapi is confined to the northern part of the Congo forest, near the Semliki R.

Okayama, cap. of prefecture of same name, Bizer prov., S.W. Hondo, Japan, 90 m. w. of Kobé; is noted for its castle and superb gardens. Pop. (1898) 58,025.

O'Keefe, or O'KERFFE, JOHN (1747-1833), Irish dramatist, acted for a time in Dublin, but in 1780 settled in London, where he produced light comedies and musical farces. Among the most popular were The Agreeable Surprise (1781), Wild Oats (1791), Modern Antiques (1791), and Sprigs of Laurel (1793). He was the author of the song I am a Friar of Orders Gray.

Okefinokee Swamp, large tract of S.E. Georgia and N. Florida, U.S.A., some 500,000 acres in area. It is infested with alligators.

Oken (shortened from OCKEN-FUSS), LORENZ (1779-1851), German naturalist, studied at Würzburg and Göttingen, and began early to develop in his works those principles and methods by which he attempted to construct an a priori system of knowledge. They appeared in Dic Zeugung (1805, Lehrbuch der Naturphilosophie (1808-11; Eng. trans. 1847), Lehrbuch der Naturgeschichte (1813-27), and other works. He originated the idea of the annual meetings of German scientists, on which the British Association was modelled. See Memoirs by Ecker (1880) and Güttler (1884).

Okhotsk, SEA OF, branch of the N. Pacific Ocean, to the E. of Siberia, separated from Bering Sea by the peninsula of Kamchatka, from the Pacific by the Kurile Is., and from the Sea of Japan by the island of Sakhalin. Tartar Strait, w. of Sakhalin, and La Perouse Strait, s. of it, communicate with the Sea of Japan. The sea is icebound from November to April. Its shores are inhospitable, and fogs and storms are common. Nikolaievsk and Okhotsk are the chief ports.

Oki Islands, N. of Izumo prov., Japan, with area 130 sq. m. The largest is Dogo, whose capital is Saigo. Cuttle-fish are exported.

Pop. 62,800.
Oklnawa Sima. See Loo-choo.
Oklahoma. (1.) A state of the
U.S.A., organized as a territory
in 1890, and admitted as one state
with Indian Territory in June
1906. Its surface is an undulating
plain, rising gradually westward;
it is treeless, except in the east.
It is crossed by the Cimarron and
Canadian rivers, branches of the
Arkansas. A part of its area is

occupied by Indian reservations. The capital is Guthrie. The chief products are Indian corn, wheat, oats, cotton, and stock. The principal industries are flour-The principal industries are flour-milling and the manufacture of cottons seed oil. Area, 39,030 sq. m. Pop. (1900) 398,330. (2.) City, Oklahoma, U.S.A., co. seat of Oklahoma co., on the north fork of Canadian B., 35 m. s. of Guthrie. Pop. (1900) 10,037. Oku, Baron (1847), Japanese soldier, greatly distinguished himself at the siege of Kuma-moto Castle by the Satsuma in-

moto Castle by the Satsuma insurgents (1877), and in the war with China (1895). In the Russo-Japanese war (1904-5) he commanded the Second Army, and won the brilliant victory of Kinchau, and subsequently did splendid work in Manchuria. See RUSSO-JAPANESE WAR.

Okuma, Shigenobu, Count (1837), Japanese statesman, born in the province of Hizen, Kiushiu. On the rebellion of 1868 against the old régime he advocated the abolition of the prevailing feudal system, and the establishment of constitutional government. On the reorganization of the govern-ment under the Mikado he became chief assistant in the department of foreign affairs, and subsequently secretary of the interior and finance, and president of the Japanese commission at the Vienna exhibition. He was minister of finance in 1873; became leader of the progressive party in Parliament; and in 1887 advocated the revision of the old treaties, with the object of throwing Japan open to the trade of the world—an action which created great popular excitement, resulting in an outrage which left him a cripple. The revision of the treaties was, however, secured. He joined the Matsukata cabinet as foreign minister in 1896, hut resigned shortly afterwards. On the retirement of the Marquis Ito he became premier and minister of foreign affairs (1898-99)

Olaf, the name of several Norwegian kings, among them OLAF I. (956-1000), son of Tryggye, king of Vik in Norway. After being converted to the Christian faith in England he made a raid upon Norway, where, after the murder of Jarl Haco, he was recognized as king. He devoted all his energy to the Christianizing of the land; built the first churches and founded the sec of Nidaros, afterwards Trondhjem. He was defeated and slain at the battle of Svoldr by the confederate kings of Denmark and Swe-den.—OLAF II. (995-1030), called the Saint, seized the Norwegian crown in 1016. His refusal to recognize the overlordship of Denmark involved him in a war with Canute the Great, and Olaf was compelled to fly to Russia. On attempting to recover his realm in 1030 he was killed. He was buried in the cathedral of Trondhjem, and canonized 1164, when he became the patron saint of Norway, the Christianizing whereof was mainly his work.

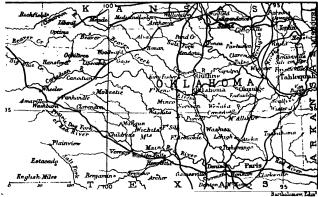
Oland, a Swedish isl. in the Baltic, 80 m. long and from 5 to 10 m. broad. The higher part affords pasturage for cattle; only the lower-lying coast is cultivated. The chief products are corn, chalk, sandstone, and alum. Pop. (1900) 30,400. Olaus, Magnus. See Mag-

Olaus, Petri (1493-1552), Swedish reformer, shared with his brother Laurentius the work of spreading Lutheran doctrines in Sweden, and of translating the Bible into Swedish. Appointed chancellor in 1531 by Gustavus Vasa, he was in 1539 condemned

Olbia, a Greek city, a colony from Miletus, which stood near the mouth of the river Borysthenes (the Dnieper) in S. Russia. It was sacked by the Getæ about 50 B.C.

Olcott, HENRY STEEL (1832), American theosophist. During the civil war he served in the army of the North, and was appointed special commissioner of the war and navy departments. He helped to found the Theosophical Society, of which he is president, and has written Theosophy, Religion, and Occult Science (1885), The Buddhist Catechism (1882), and Old Diary Leaves (3 series, 1895-1904). See THE-OSOPHY.

Old-age Pensions. In 1893 a royal commission was appointed to consider the subject; but the members were unable to agree upon a practicable scheme. In 1896 an 'expert' committee, with Lord Rothschild as chairman,



Oklahoma.

to death for failing to give information of a plot revealed to him through the confessional. But his life was spared, and he spent his later years as a pastor at Stockholm. He left hymns, tracts, and a mystery play, besides memoirs.

Olax, a genus of tropical trees and shrubs belonging to the order Olacineæ. They bear spikes or racemes of small flowers, and entire leaves arranged alternately.

Olbers, Heinrich Wilhelm Matthäus (1758-1840), German astronomer and physician. method of calculating the orbits of comets which he originated (1779) proved of great importance to astronomy, and is set forth his Abhandlung über Leichteste Methode die Bahn eines Kometen zu Berechnen (1797). See Barkhusen's Bio-graphische Skizzen Verstorbener Bremischer Aerzte (1844).

received upwards of a hundred schemes, but, after a two years' inquiry, reported that none of them would attain the object in view-viz. the encouragement of the industrial population, by state aid or otherwise, to make provision for old age. In 1899, however, a scheme was pro-pounded by a select committee presided over by Mr. Chaplin, which recommended the following suggestions: The applicant must be (1) a British subject; (2) sixty-five years of age; (3) free for twenty years from the taint of imprisonment, (4) and of pauperism, 'unless under circumstances of a wholly exceptional character;' (5) a resident within the district or area of the pension authority; (6) without an income from any source of more than 10s. a week; and (7) reasonably prudent and thrifty. A departmental committee was then appointed to settle the cost of

the scheme, when they reported that an allowance of 6s. per week would cost the nation £9,976,000, plus £299,000 of administrative expenses, the total burden in 1921 being estimated at nearly £16,000,000. It was calculated in 1903 that Mr. Charles Booth's 'universal' scheme of pensions would cost nearly thirty-three

millions sterling.

In New Zealand a successful scheme has been in operation since 1899. Persons of the age of sixty-five and upwards, except aliens and other classes specified, can, under certain conditions, obtain a pension of £18 per annum, by twelve monthly instalments, paid on the first day of each month, unless he or she is in jail, an asylum, or outside the colony. On March 31, 1905, the pensioners numbered 11,770, and the outlay £195,475—the lowest for five years—the administration costing only £3,936. For a number of years old-age pension schemes have been in operation in Germany, Denmark, Belgium, France, Italy, and Roumania. A special form was established in Denmark in 1891 for applicants over sixty unable to provide the necessaries of life or proper treatment in case of sickness for themselves or their dependants-the conditions being that their poverty was not due to their own fault, that they had ten years' fixed residence in the country, and that they had never been sentenced for vagrancy or begging. The expenses of the relief are defrayed by the various communes, one-half of the expenses being refunded by the state. The pension granted is from 2s. to 3s. 7d. per week for persons with families, and from 1s. 4d. to 3s. per week for single persons. The larger sum is given in the towns, and the smaller in country districts. In 1900 the number relieved (including dependants) was 53,521, the cost to the communes being £142,647, and to the state £142,848.

In France the compulsory provision for old age exists only in the case of seamen and miners. The state, however, undertakes the assurance of old-age pensions for all classes of the community who care to make the requisite payments through an institution known as La Caisse Nationale des Retraites pour la Vieillesse, and provides a certain amount of assistance for those who avail themselves of this institution. Germany has a most successful scheme of old-age pensions—second only to that of New Zcaland, with 839,000 pensioners in 1902. The Sign to pensioners in 1902. The full results from 1891 to 1902 are given in *The Daily Mail' Year Book*, 1905, 1906, the figures being most instructive. Italy has also adopted the system, a na-

tional pension fund having been adopted in 1898. In Belgium there is a cognate society to that of France. Old-age pensions have also been established in Victoria and New South Wales. See parliamentary paper entitled Provisions for Old Age by Government Action in certain European Coun-

tries, C, 9414 (1899).
Old Bailey, a street in the city of London where the sessions house is situate in which are held the sittings of the Cen-

tral Criminal Court.
Oldbury, tn., Worcestershire,
5 m. w. of Birmingham, England, with iron and steel, chemical, boiler, and railway-carriage works. Pop. (1901) 25,191.

Oldcastle, SIR JOHN, LORD COBHAM (d. 1417), English nobleman who took part in the sup-pression of the Welsh revolt under Owen Glendower, and then went to help the Duke of Burgundy (1411). For assisting Lollard preachers he was, in 1413, excommunicated, and executed under circumstances of great barbarity. He is generally regarded as the original of Shakespeare's Falstaff. See Foxe's Acts and Monuments of the Church (1562), Gaspey's Life and Times of the Good Lord Cobham (1843), and Brown's The Leader of the Lol-

lards (1848).
Old Catholics, the body of Roman Catholics who in 1870 took exception to the new dogma of the personal infallibility of the pope. Forty-four German professors, led by Dr. Döllinger and Dr. Friedrich, issued a protest against the dogma at Munich, and drew up a declaration shortly after at Nuremberg. At first the movement gave signs of spreading throughout Bavaria and the Rhineland. In 1873 Professor Reinkens of Breslau was consecrated bishop at Rotterdam by the bishop of Deventer, and was finally recognized by the governments of Prussia, Baden, and Hesse. Of late, however, the membership has rapidly declined. There were some interesting communications between the Old Catholics and the Anglican and Greek Churches, and great hopes were entertained at one time that in the Old Catholic movement a basis might be found for the intercommunion and perhaps reunion of the churches. See Scarth's Story of the Old Catholic and Kindred Move-ments (1883), Von Schulte's Der Altkatholizismus (1887).

Oldenburg. (1.) A sovereign grand-duchy of the German empire, consisting of three divisions: (1) the grand-duchy, adjoining the North Sea; (2) the princi-pality of Lübeck, immediately N. of the state of Lübeck; and (3) the principality of Birkenfeld in

the s. of the Rhine Province. The grand-duchy proper consists of marsh and geest (high heath and moor) land. The breeding of horses, cattle, and sheep, and the keeping of bees, are considerable industries. Brickmaking, cork and turf cutting, brewing and distilling, and tobacco manufac-ture are also carried on. Lübeck possesses more pleasing natural features than the grand-duchy proper. Birkenfeld is covered with forests to the extent of 40 per cent. of its surface. The cutting of gems (agates) and manufacture of imitation jewellery are Total area, thriving industries. 2,480 sq. m. Pop. (1901) 399,180. The grand-duchy has one vote in the Imperial Federal Council, and sends three representatives to the Imperial Diet. In 1180 to the imperial Det. In 1180 it was declared a countship of the empire, in 1777 made a duchy, and in 1829 a grand-duchy. The principality (formerly bishopric) of Lübeck was added in 1803, and the princi-pality of Birkenfeld in 1815. The reigning dynasties of Denmark and Russia are descended from the same ancestral stock as the grand-dukes of Oldenburg. (2.) Town, cap. of the grand-duchy of Oldenburg, 271 m. w. of Bremen. Has a grand-ducal palace, and exports leather goods, soap, machinery, and musical instruments. Pop. (1900) 26,797.



Old English Sheep-dog.

Old English Sheep-dog, or bob-tailed sheep-dog, belongs to the southern counties of England. It is also known as the drover's dog, and in Sussex as the cowdog, from its ability to bring the cows in one by one to be milked, without ever fetching a second time a cow which has been milked. The dog should be born without a tail; but a peculiarity of the breed is that puppies with and without tails are found in the same litter. Points: Colour, any shade of blue, blue merle, steel-gray or grizzle, with white on legs and face, for relief; head big and square; eyes small and dark, in very light-coloured dogs wall or marble; body square, and as large as possible; high and heavy hind quarters; higher at the loin than at the shoulder; densely coated all overwith a harsh, broken, wavy coat; ears small and neatly set on side of head, covered with wavy hair; feet large and round; legs straight, strong, and clothed with hair in sprofusion; tail absent.

Old English Terrier, or white English terrier, is one of the oldest breeds in the terrier tribe, and is considered the model of a vermin dog, provided he is not called on to cope with the badger or any other animal beyond his strength. His weight varies from 6 lbs. to 20 lbs., and the smaller he is the better. Points: Head narrow, long, and flat; muzzle fine, tapering, sharp and foxlike; jaw muscular, and never underhung; stop pronounced; eyes small, bright, and sparkling; ears (since cropping was abolished) round and flat to the head, a prick ear being a great deformity; neck long,



Old English Terrier.

tapering, and muscular; tail whip and not docked, carried low; legs straight; feet round; toes well split; hind legs moderately straight, with large and muscular thighs; colour, white preferred. There are blue or blue-fawn varieties, but these are suspected of descent from a cross with the Italian greyhound.

Oldfield, ANNE, otherwise 'NANCE' (1683-1730), English actress, made her debut at Drury Lane (1692). In 1704 she achieved a great success as Lady Betty Modish in Colley Cibber's Careless Husband, and was thenceforth recognized as the most brilliant actress of her day, both in tragedy and in comedy. Among her successes were Mrs. Townley in Three Hours after Marriage (1717), Lady Matchless in Love in Several Masques (1727), and the title rôle in Sophonisha (1729). See Authentick Memoirs (1730); Egerton's Memoirs, with portrait (1731).

Oldham, munic.. parl., and co. bor., Lancashire, England, 7 m. N.E. of Manchester. The town hall is a handsome structure in the Grecian style, and amongst other public buildings are the county court, post office, free library, and museum. The town is the

chief centre of the cotton-spinning industry, over twelve million spindles being employed, more than one-fourth of the total for Lancashire and neighbouring district. The fabrics produced include velvets and velveteens, fustians, sheetings, nankeens, and sateens. There are also large engineering works. In the district are important collieries. Pop. 137,238.

Oldham, John (1653-83), poet, was born at Skipton-Moyne, near Tetbury, Gloucestershire. was a tutor (1678-81), gained the friendship of Dryden, and was a favourite with the Earl of Kingston, at whose seat, Holme-Pierrepoint, Nottingham, he died of smallpox. Oldham wrote two excellent Pindaric Odes; but his reputation rests on his satires, and especially on his energetic Satires upon the Jesuits (1681), Satire addressed to a Friend about to leave the University, and his translation of Juvenal. His Poems and Translations appeared in 1683, and Remains in Verse and Prose in 1684. Edward Thompson issued a complete edition of his works, with mem-

Oldmixon, John (1673-1742), historian and minor poet, is best known for his histories and pamphlets. The former include The British Empire in America (1708), The Secret History of Europe (1712-15), Memoirs of North Britain (1715), Critical History of England (1724-6), and three volumes covering the history of England from Henry VIII. to George I. His work was antipapist and anti-Jacobite in tone. He figures in Pope's Dunciad. See his Memoirs of the Press (1742).

Old Point Comfort, favourite seaside resort, Elizabeth City co., Virginia, U.S.A., from which Fort Monroe commands the entrance

to Hampton Roads.
Old Red Sandstone corresponds in time to the marine deposits of the Devonian, and is a scries of red sandstones, gray and yellow sandstones and flagstones, with scams of red or gray shale and occasional beds of impure concretionary limestone. The total thickness of these rocks in Scotland cannot be less than 20,000 feet. They are subdivisible into three groups:—

(3.) UPPER, with Bothriolepis, Holoptychius.

(2.) MIDDLE OF ORCADIAN, with Pterichthys, Coccosteus.
(1.) LOWER OF CALEDONIAN, with

Cephalaspis, Pteruspis.
Each of these contains volcanic rocks, but they are most abundant in the Caledonian, where they form the Pentland, Ochil. Sidlaw, and Cheviot Hills. No marine fossils are found in any

of these beds, and they are undoubtedly the deposits of extensive fresh-water lakes scattered over the surface of a large Devonian continent which lay in the north of Europe; while to the south there was clear open sea in which true marine deposits were being laid down simulta-neously. Old Red Sandstone is found also in Wales, resting on the Silurian and underlying the Carboniferous rocks, and in the south of Ireland, in Killarney. Similar red rocks with fossil fishes occupy considerable areas in Russia, alternating with ma-rine strata containing Devonian fossils. In Norway and Spitz-bergen Old Red deposits occur; also in the United States and in Canada, where they contain abundant fossil fishes and plants. Attention was first directed to this formation by the remarkable and almost grotesque appearance of its fossil fishes. See Agassiz's Poissons Fossiles du Vieux Grès Rouge; and Hugh Miller's The Old Red Sandstone (1841), Foot-prints of the Creator (1850), and The Testimony of the Rocks (1857); also Smith Woodward's British Museum Catalogue of Fossil Fishes. For the Canadian deposits, see Sir J. W. Dawson's Acadian Geology (1855; new ed. 1868); for those of the United States, the bibliography by H. S. Williams (U.S.A. Geological Survey Bulletins).

Oldys, WILLIAM (1696-1761), bibliographer and antiquary; he gained some reputation through the 'Life of Raleigh,' prefixed by him to an edition of his father's History of the World. He acted as literary secretary to Edward Harley, Earl of Oxford (1738-41), when Oldys collaborated with Dr. Johnson on a catalogue of Harley's library. He was appointed Norroy king of arms by the Duke of Norfolk. Among his works are The British Librarian (anon. 1737), and a Life of Charles Cotton, prefixed to the Compleat Angler (ed. 1760). See Memoir by Yeowell in Notes and

Queries (Jan. and Feb. 1862). Olea. See OLIVE.

Olean, tn., Cattaraugus co., New York, U.S.A., 70 m. S.E. of Buffalo; is in a rich oil and natural-gas region. Pop. (1900) 9.462.

Oleander, a genus of subtropical, highly poisonous shrubs, order Apocynaccæ. They bear racemose cymes of shady, infundibuliform flowers, and wherls of coriaceous leaves.

Oleandra, a genus of tropical ferns with scandentshoots, jointed stems, and entire fronds. The species are often cultivated in the stove-house as pillar plants, a wire cylinder surrounding the pillar, and the intervening space being

filled with sphagnum moss and fibrous peat, on the surface of which the creeping rhizome is laid.

Olearia, a genus of shrubs, order Compositæ, many of which are grown as conservatory or as hardy border plants. They like a light, moderately rich soil, and are easily propagated by cuttings of half-ripened young shoots.

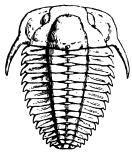
Oleaster, small trees belonging to the genus Elwagnus. A native of Asia and S. Europe, it has leaves and young shoots covered with fine hairs. It bears fragrant yellow flowers and red-

dish-brown fruit.

Olefiant Cas. See ETHYLENE. Oleic Acid, C₁₇H₃₅COOH, is an unsaturated acid occurring as its glycerol ester, olein, in many fats and oils, such as olive and cod-liver oil. It is prepared by saponifying olive oil with caustic potash, and purifying the product by means of the lead salt, from which the acid is set free by addition of hydrochloric acid. Oleic acid is a colourless oil (sp. gr. 9) which crystallizes in white needles on freezing (m.p. 14° c.). It is tasteless and odourless, but becomes rancid on exposure to air. It does not redden litmus, but forms a series of salts, the oleates, which, like the acid itself, closely resemble the corresponding derivatives of the fatty acids, to one of which, stearic acid, oleic acid is reduced by hydriodic acid, or to two others, palmitic and acetic, by fusion with caustic al-kali. Oleic acid is used for the preparation of palmitic acid, and in the manufacture of soap.

Olenek, riv. of Siberia flowing into the Arctic Ocean. It rises near the sources of the Khatanga and Vilyu, and has a length of some 1,200 m. Its mouth is near

the delta of the Lena.



Olenus.

Olenus, a genus of trilobites, akin to Paradoxides, found in the upper Cambrian rocks over a very large part of the world. highly characteristic fossil has rounded head, eyes, small free cheeks, usually fourteen body segments, and a small tailpiece

or pygidium. Equally important is Olenellus, which is found in the lowest Cambrian beds, and is the typical trilobite of the oldest fauna the remains of which have yet been discovered by geologists. It has well-developed eyes, from thirteen to eighteen body segments, and is often ornamented with large spines.

592

Oleo-Margarine. See MAR-GARINE.

Oléron, THE LAWS OR JUDG-MENTS OF, were a mediaval code of maritime law prevalent in W. Europe. It is said to have been promulgated by Eleanor of Guienne, mother of Richard 1., about the middle of the 12th century. It regulated the conditions of the wine and oil trades.

Oléron, isl., France, part of dep. Charente Inférieure, opposite to mouth of river Charente and Rochefort. 1t is 19 m. long by 5 m. broad, with an area of 66 sq. m. Pop. (1901) 17,720. Fishing and the production of wine

are the chief industries.

Olga, ST. (d. 969), wife of Duke Igor of Kiev, for ten years after whose death (945) she ruled as regent for her son. About 955 she was baptized at Constantinople as Helena, and afterwards showed a missionary zeal among her own people which led to her canonization, July 21 being set apart for her in the calendar.

Olibanum, a resin obtained from certain trees belonging to the genus Boswellia, a subdivision of the order Amyridacee. African olibanum is the product of B. Carterii and B. frereana, whilst Indian olibanum, or frankincense, is the product of

B, thurifera.

Oligarchy, a term signifying 'the government of the few.' is first used by Herodotus (c. 430 B.C.), who contrasts it with the government of a monarch and that of the people. Aristotle regarded aristocracy as differing from oligarchy in governing for the public good, while oligarchs aimed at their own advantage. Examples of oligarchical states in ancient Greece were Thebes, Corinth, Sicyon, Megara, and in-deed most Dorian cities. Between 150 B.C. and the establishment of the empire the Roman constitution was practically oligarchical; while in modern times Venice, Florence, and other Italian communities were oligarchies. aristocracy always tends to degenerate into an oligarchy. At the present time no confessedly oligarchical states can be said to exist.

Oligocene System, the epoch which elapsed between the close of the Eccene and the beginning of the Miccene. In England the rocks are found only in the Isle of Wight and the Hampshire

basin, and consist of fresh-water and brackish-water sands, marls, and limestones, often very nich in well-preserved fossil shells. Their subdivisions are the Headon, Osborne, Bembridge, and Hempstead beds. The Oligocene of the Paris basins has the same general facies as that of S. England, and includes the gypsum of Montmartre (from which Cuvier described many fossil mammals), the Fontainebleau sandstone, and the millstone grit of Montmorency. In Germany and Central Europe Oligocene beds have a considerable development, and in Halle contain thick deposits of lignite. In N. Germany amber is found in Oligocene sands. The Vicksburg beds of the eastern states of America are marine Oligocene deposits, but in the interior of the continent they are represented by the famous White River beds, which are fresh-water clays and sandstones, and have yielded many remains of fossil mammalia.

Oligoclase, one of the plagioclase or sode-lime felspars very common in granite, trachyte, and

rhyolite.

Olinda, tn. in Pernambuco, Brazil, 4 m. from Recife. It was formerly the capital of the state, and one of the richest cities in Brazil, but is now only a resort of the inhabitants of Recife. Pop. about 8,000.

Oliphant, Laurence (1691-1767), Jacobite laird of Gask, Perthshire; took up arms for Charles James Stuart in 1715, and served at Sheriffmuir, as well as in the garrison at Scone. Joining Charles Edward in 1745, he shared with Lord Strathallan the government of the north of Scotland during the prince's expedi-tion into England. He fought at Falkirk and Culloden, and on the downfall of the Jacobite cause escaped to the Continent. See Anderson's Oliphants in Scotland

Oliphant, LAURENCE (1829-88), barrister and author, born at Cape Town, was private secretary to the Earl of Elgin in Canada in 1854, and in China in 1857, in the interval accompanying Omar Pasha on one of his expeditions. When charge d'affaires in Japan in 1861 he was severely wounded by assassins. In 1862 he left the diplomatic service. His religious views induced him for a time to join the community of Thomas Lake Harris at Salem-on-Erie' in the United States, and then to settle at Haifa in and then to settle at Haifa in Palestine. Oliphant published A Narrative of the Earl of Elgin's Mission to China and Japan in 1867-9 (1860). The amusing Patriots and Filibusters also appeared in 1860. In 1870 Oliphant published Piccadilly, an observant, satirical, radiant book. His peculiar mysticism colours his remaining works, which include two novels, Altiora Peto (1883) and Masollam (1886), and two religious treatises, Sympneumata (1886), 'and Scientific Religion (1888).' Other works are The Land of Gilcad (1880), The Land of Khemi and Traits and Travesties (1882), Haifd, or Life in Modern Palestine, and Fashionable Philosophy (1887). See Oliphant's Episodes in a Life of Adventure (1887), Mrs. Oliphant's Memoir of the Life of Laurence Oliphant (1891), Liosching's Personal Reminiscences (1892), and Blackwood's Magazine, 1889, vol. .

Oliphant, Margaret Oliphant WILSON (1828 97), novelist and biographer, was born at Wally-ford, near Musselburgh. In 1852 she married her cousin Francis Oliphant. Gaining attention with her clever Scottish story, Passages in the Life of Mrs. Margaret Maitland (1849), Mrs. Oliphant made a great impression with Katie Stewart (1852). With the series entitled Chronicles of Carlingford (1863-66 and 1876), published anonymously, she took her distinctive position as a novelist. These works-The Rector and the These works—The Rector and the Doctor's Funily and Salem Chapel (1863), The Perpetual Curate (1864), Miss Marjoribanks (1866), and Phæbe Junior (1876)—display, broadly and decisively, constructive power, apposite humour, and ease and grace of characterization and description. of characterization and description. Other novels are John (1870), May (1873), A Rose in June (1874), The Primrose Path (1878), Sir Tom (1884), Joyce (1888), Kirsteen (1890), Old Mr. Tredgold (1896), and—character-Treagold (1896), and characteristically Scottish—That Little Cutty (1898), Mrs. Oliphant is authoritative in her Life of Edward Irving (1862), Historical Sketches of the Reign of George IL (1869), Francis of Assisi (1871), Memoirs of the Count de Monti-lembert (1872), The Makers of Florence (1874), The Makers of Venice (1887), Life of Principal Tulloch (1888), Royal Edinburgh (1890), Life of Little (1890), Life of Laurence Oliphant (1891), and Mukers of Modern Rome (1895). She wrote the first two volumes of Annals of a Publishing House: William Blackwood and Sons, See her Auto-biography and Letters, edited by Mrs. Coghill (1899).

Olivares, GASPAR DE GUZMAN, COUNT OF (1587-1645), Spanish statesman, became prime minister, to Philip IV. on the latter's accession in 1621, and strove to raise Spain to the first place in Europe. But while fostering commerce and effecting internal reforms, he plunged the kingdom into disastrous wars, the heavy cost of which drove Spaniards

as well as Portuguese into revolt, and thus brought about his own downfall and banishment in 1643. Throughout his career he was engaged in an unequal struggle with the overmastering genius of Richelieu, who then controlled France. See De la Rocca's Histoire du Ministère du Conte-Duc d'Olivares (1673).



The Olive.

1, Corolla, open; 2, calyx; 3, pistil;
4. fruit: 5. stone.

Olive. The wild olive (Olca europæa) is a native of the Mediterranean, and has gradually become naturalized in a number of other countries with somewhat similar climatic conditions. modern cultivated olive contains much more flesh and much more oil than did its wild ancestor. The salted olives which are sold in bottles are unripe fruits soaked in water and then bottled in brine containing aromatic substances. The olive has sharp and slender leaves of a grayish green, resembling, but somewhat smaller than, those of the common willow Its fruit, when ripe, is black and lustrous, but small.

Olive Branch Petition (1775), the ultimatum offered by the American colonies to England before the war of independence. Drawn up by Congress, the document was conveyed to London by Richard Penn, only to be set at naught by the king and his ministers.

Olivenite, a hydrous arsenate of copper which crystallizes in dark-gree hombic prisms (h.=3, sp. gr. 4.3), but is more usually found in fibrous or reniform aggregates. It occurs at Redruth in Cornwall and Tavistock in Devon, but is by no means common.

Olivenza, fort. tn., Spain, on l. bk. of river of same name, 20 m. s.s.w. of Badajoz; has tanneries, potteries, and flour mills. The town was ceded to Spain by Portugal in 1801. Pop. 9,066.

Offive Off chiefly consists of triolein, C₃H₅(OOC C₁H₃₂)s, which is the glycerol ester of oleic acid, obtained from Olea europea by expression of the dried fruit. A further supply of an inferior quality is produced by repeatedly treating the press cake with boiling water and re-pressing, any oil still remaining being extracted by a volatile solvent such as petroleum spirit. It may be purified from admixed glycerol esters of the fatty series by cooling. The fruit yields on the average 30 per cent. of oil, which is of specific gravity '914 to '917, and of a greenish colour and bland davour when fresh, but soon becomes rancid. The better qualities are used for food, and the inferior for lubrication and the manufacture of soap. Olive oil is much sophisticated with cheaper oils, such as cotton-seed oil.

Olives, Mount of, or Oliver (Zech. 14:4; Matt. 21:1, etc.; Acts 1:12; mount of corruption, 2 Kings 23:13), a rising ground to the E. of Jerusslem, over against the Temple hill, and separated from it by the Kidron valley; now called Jebel-et-Tur (2,700 ft.) At its summit is the Church of the Ascension; on its w. slope Gethsemane. The name is also used of the whole ridge which runs parallel to the E. spur of Jerusslem, including the Scopus or 'Prospect,' N.E. of the Temple; the 'Prophets' (so called from the tombs found there), a S. extension of Olivet proper; and the Mount of Offence (2,440 ft.), opposite the pool of Siloam. David fied from Absalom by way of the mount (2 Sam. 15:14, 30), and it was probably the site of the altars dedicated by Solomon to Chemosh (1 Kings 11:7). See Stanley's Sinai and Palestine, 185 ft. 452 ft. Olivetans, a Roman Catholic religious order founded in 1313.

Olivetans, a Roman Catholic religious order founded in 1313, an offshoot of the Benedictines, but following a severer rule. Their founder, Giovanni de' Tolomei, once a professor of philosophy at Siena, was appointed the first general in 1319. The order possesses about twelve houses.

Olivier, Juste Daniel (1807-76), French-Swiss author and poet, born at Eysins (Vaud); was occupied from 1845-71 in teaching in Paris, where Sainte-Beuve was his intimate friend. In 1871 he returned to Switzerland. He became widely known through his poem Les Chansons tointaines (1847), and through his novels. A selection of his works, with memoir by Rambert, appeared at Lausanne in 1879. See Berthoud's Juste Olivier (1880).

Olivine, (FeMg), SiO, a ferrous and magnesium orthosilicate, and a very common mineral of igneous rocks, crystallizes in small, olivegreen, rhombic prisms (h. = 6.5, sp. gr. 3.4). Large specimens are obtained from the East and from Brazil, and are cut as gems under the name of peridote; but they are rare. Olivine occurs also in grains in many metcorites. Many lavas are rich in olivine (especially the basalts), and some plutonic rocks, such as peridotite and dunite, consist largely of this mineral. Olivine weathers readily to surpentine.

illy to serpentine.

Olia Podrida, or OLLA ESPANOLA, a Spanish dish consisting
of nunerous varieties of fish,
meat, poultry, and vegetables,
the whole spiced with pepper,
garlic, and other flavourings, and

mie et dans l'Histoire (1888), Solutions Politiques et Sociales (1894), and L'Empire Libéral (11 vols. 1895-1906). See Marcas's Emile Ollinier (1865)

Emile Ollivier (1865).

Olmsted, Frederick Law (1822-1903), American authority on agriculture and landscapegardening, born at Hartford, Connecticut; undertook a tour in Great Britain (1850) and in the Southern States (1852-3), the results of which appeared in Walks and Talks of an American Farmer in England (1852), and Journeys and Explorations in the Cotton Kingdom (1862), which aroused much interest at the time of the American civil war.

Olney, RICHARD (1835), American statesman and lawyer, born at Oxford, Massachusetts; was called to the bar in 1859. Appointed attorney-general in 1893, he became secretary of state in 1895-7, and conducted the cegotiations with Great Britain relating to the Venezuelan boundary.

Olonets. (1.) Government, N. Russia, extending from Lake Ladoga almost to the White Sea. Area, 57,439 sq. m. Pop. (1897) 366,715. It has a harsh, moist climate, unfavourable to agriculture. The principal industries are the timber trade (over 60 per cent. being under forest) and fishing. Cap. Petrozavodsk. (2.)



Mount Olivet.

stewed with a little water. The name is used figuratively to designate a medley.

Ollivier, OLIVIER EMILE (1825), French statesman, born at Marseilles; practised at the bar, served in the Legislative Assembly, and in 1865 was chosen to represent the Egyptian government in the negotiations on the Suez Canal question. As the virtual head of the ministry of 1870, he sought at first to preserve peace, but changed his views and carried the nation into the war whose first disasters brought about his own fall. Among his works are Démocratie et Liberté (1867), Principes et Conduite (1875), M. Thiers à l'Acadé-

Olmütz, tn. and archiepiscopal see (1777), Moravia, Austria, on an isl. in the March R.; was a fortress until 1886. It has interesting churches, and a university founded in 1581 (suppressed in 1855, with the exception of the theological faculty). It manufactures malt, beer, sugar, starch, and alcohol. Lafayette was imprisoned here in 1794, and Ferdinand I. here resigned the crown to his nephew in 1848. Pop. (1900) 21,933.

Olney, tn., Buckinghamshire, England, on the Ouse, 12 m. from Bedford. The church dates from the 14th century. The poet Cowper resided here nearly twenty years. Pop. of par. (1901) 2,684. Town, Olonets gov., N.W. Russia, about 120 m. N.E. of St. Petersburg, with a market for timber and furs. Pop. (1897) 1,303.

Oloron, tn., dep. Basses-Pyrsnees, France, 22 m, by rail w.s.w. of Pau; stands on the Gave d'Oloron (Adour basin). Manufactures leather, woollens, and flour. The town contains two interesting Romanesque churches (11th century). Pop. 9,078.

Olsnitz. See OELSNITZ.

Olsnitz. See OELSNITZ., Olt, ALT, or ALUTA, riv. of S.E. Europe, rises in the Carpathian Mts., flows w.s.w. through Transsylvania and Roumania, and enters the Danube opposite Nicopolis. Length, 310 m.; drainage area, 9,000 sq. m.

Olten, tourist resort and railway centre, canton Solothurn, Switzerland, on l. bk. of Aar, 24 m. by rail s.E. of Basel; has railway workshops and shoe factories. Pop. (1900) 6,969.

Oltenitza, port in Ilfov co., Roumania on Danube. Here, on Nov. 4, 1853, was fought the first engagement of the Crimean war, when the Turks defeated the Russians. Pop. 5,334.

Olympia, place of entertainment in London, was opened on Boxing Day 1886. The ground floor covers 109,750 superficial feet; the glass roof has a clear sweep of 170 feet; the semicircular ends of the arena are filled in with tiers of stalls, balconies, and galleries; and there is seating capacity for nine thousand people. There are five and a half acres of garden ground surrounding the building, and these, like the great hall itself, are illuminated in the evening by electricity.

Olympia, city of Washington, U.S.A., the co. seat of Thurston co., and the state capital, at the head of Puget Sound, 28 m. s.w. of Tacoma. Principal industries are lumbering, oyster rearing, brewing, and iron-founding. Pop.

(1900) 3,863.

Olympia, religious centre in ancient Greece, consisted of an enclosure two hundred and fifty yards in length by two hundred in width, in which stood a temple of Zeus, others of Hera and of the Mother of the Gods, a shrine of Pelops, the Philippieion—a build-ing erected by Philip of Macedon to commemorate his victory at Chæronea — a council-chamber for the presidents of the games, a colonnade, twelve treasuries in which the various Greek states deposited their offerings, and numberless statues. Outside was a palæstra or wrestling-ground, a covered race-track, and buildings for the use of the competitors in the games, who had to spend the last period of their training at Olympia. In the 6th century A.D. earthquakes threw down the temple of Zeus and other buildings; about the same time a landslip covered some of the buildings. The site was excavated by German scholars between 1874 and 1881. There was found the Hermes of Praxiteles, an almost perfect specimen of one of the greatest Greek sculptors. The OLYMPIO GAMES existed from immemorial antiquity. In the 9th century B.C. Iphitus of Elis is said to have reorganized the games, establishing peace between all Greek states during the festival. The traditional list of victors began in 776 B.C. The games were held every four years, at the first full moon after the summer solstice. The festival lasted five days.

The earliest and most important contest was the stadion, or short foot race of about 200 yards: this was the only event from 776 to 728. There were later introduced at different intervals the diaulos, or race of twice the length of the stadion; the long of twenty-four stadia; wrestling; the pentathlum, or allround contest in running, leaping, throwing the quoit, the javelin, and wrestling; boxing; the pancratium; the chariot race for four horses; the horse race; boys' contests in running, wrestling, and boxing; the foot race in heavy armour; the chariot race for two horses; chariot races for two and for four foals; contests for heralds and trumpeters; a foal race; and a boys' pancratium. Only freeborn Greeks were allowed to compete. The prizes-wreaths from the sacred ofive supposed to have been planted by Hercules— were presented to all the victors at the conclusion of the contests. Though the value of the prize was nothing in itself, the glory of an Olympic victory throughout Greece was so great that a victor obtained from his city a substantial reward in money and other privileges. The games died out during the 4th century A.D. Modern revivals of them have been held at Athens in 1896 and 1906where the ancient stadium, specially prepared for the purpose, served as a theatre—and at Paris in 1900. See E. Curtius and Adler's Ausgrabungen zu Olympia (1877-8); Die Ergebnisse der Ausgrabungen (1891-7); Botticher's Olympia (1882).

Olympiad, the period of four years which elapsed between celebrations of the Olympic games. became the most general method of reckoning time among the ancient Greeks after its introduc-tion by the historian Timæus, who flourished about 265 B.C. The Olympiads were calculated from the victory of Corebus in 776 B.C. To determine the date 776 B.C. To determine the date of any Olympiad according to the Christian era, it is necessary to subtract one from the number of the Olympiad, then multiply it by four, and subtract the result from 776, if it is less than 776-that gives the date B.C.; if the number is greater than 776, 776 must be subtracted from it, and the result is the date A.D. As the Olympic festival fell in June, events which happened in the first half of any year fall a year later according to our chronology than the date given by the process of calculation given above.

Olympias, was the wife of Philip II., king of Macedonia, and the mother of Alexander the Great. When in 337 B.C. Philip put her away and married Cleopatra, the niece of Attalus, she left Macedonia in anger, and is believed to have aided the assassination of the king in 336 B.C. After Alexander's death she took an active part in the struggles for supreme power. In 317 she assumed the sovereignty of Macedonia; but Cassander made war against her, and put her to death in 316 B.C.

Omaha

Olympiodorus, a Neo-Platonist of Alexandria, who flourished in the early part of the 6th century A.D. He left a Life of Plato (Eng. trans. by Etwall in 1771), and commentaries on the Gorgius, Physica, Philipus, and Alcibiades I.,

of Plato.

Olympus, a range of mountains in ancient Greece, divided Thessaly from Macedonia. Its greatest height is about 9,700 ft., and its top is perpetually snowelad. Greek mythology regarded it as

the abode of the gods.
Olynthus, a colony from Chalcis in Eubœa, in the Chalcidice, to the s. of Macedonia, at the head of the Toronaic Gulf. During the 5th century B.C. it was allied to Athens; after the downfall of the Athenian empire in 404 B.C. it headed a confederacy of Greek cities, until it was destroyed by Philip in 347 B.C.

Olyphant, tn., Lackawanna co., Pennsylvania, U.S.A., on the Lackawanna, 5 m. N.E. of Scranton; has anthracite coal mines.

Pop. (1900) 6,180.

Om, a Sanskrit word equivalent to Amen, implying a solemn affirmation or assent, and the word by which the gods signified their acceptance of a sacrifice. In the study of the Veda, the teacher begins his lesson and the pupil finishes it with om. The Buddhists have a sacred apothegm, Om mani padme hum ('O the jewel in the Lotus, Amen').

Omagh, tn., cap. of Co. Tyrone, Ireland, 26 m. w. by N. of Dungannon. Pop. (1901) 4,789.

Omaguas, a people of E. Peru, descendants of the Anahuacas, whose capital was reported to be El Dorado. At present their territory is confined to the left bank of the Marañon as far as the Itaya confluence. They are greatly reduced in numbers, although the Omagua language, a member of the Tupi-Guarani family, still ranges over a wide

Omaha, the largest city of Nebraska, U.S.A., and the co. seat of Douglas co., on the w. bank of Missouri R. The business part of the city is built on the slopes, while most of the residential portion is on their summit. Omaha is a railway centre of first importance. The principal industries are the smelting and refining of ores and metals, and railroad shops, linseed oil, white lead, boilers and steam-engines,

and bricks. Pop. (1900) 102,555. Adjoining Omaha is S. Omaha, a distinct city, and the centre of the second largest meat-packing industry in the world.

Omahas, N. American Indians, a branch of the Siouan or Dako-tan family, but not members of the Dakotan alliance; originally ranged both sides of the Missis-sippi in the present district of St. Louis, whence they migrated to the Lower Platte River and the Elkhorn Valley, Nebraska. Total number (1900) about 1,200.

Oman, an Arab sultanate in S.E. Arabia, on the Gulf of Ormuz. In the interior the land rises to 6,000 ft. in Jebel Akh-dar. The climate is very hot and dry, and irrigation is necessary. Oman is under British protection. The value of the foreign commerce is about £615,400, dates being the chief export. The cap. and port is Maskat. Area, 82,000 sq. m.; pop. 1,500,000.

Oman, CHARLES WILLIAM CHADWICK (1860), English his-torian born at Mozufferpur, torian, born at Mozuffer India; became fellow of Souls College, Oxford, and professor of modern history there in 1900. He has published Warwick the King-maker (1891); Short History of the Byzantine Empire (1892); History of the Art of War in the Middle Ages (1898); and Hist. of Peninsular War (1902-3).

Omar Khayyam, Persian poet, was born about the middle of the 11th century at Nishapur, Khorassan, where he died about 1123. As an astronomer he was responsible for a revision of the Persian calendar, and occupied a position of importance at the court of Mahmud of Ghuzni. It is as the author of a collection of quatrains, called the Rubaiyat, that Omar Khayyam is more popularly known. These poems isolated, inpulsive, unrestrained, and characterized by rapid transi-tions from love-minstrelsy to grave argument, and from a deadly fatalism to ribald tavern song—are an interesting develop-ment of Persian mysticism. Like the Song of Solomon, while some interpret them literally, others find in them veiled meanings and a mysterious Sufism. There is little doubt that Omar was not the author of all the poems which inspired his translator Fitzgerald's pen. Fitzgerald's Fitzgerald's pen. Fitzgerald's translation, first published anony-mously in 1859, provoked no enthusiasın, until a sudden realization of its value led to the issue of other four editions before the death of its author in 1883.

Omar Pasha (1806-71), Turkish general, whose real name was Michael Lattas, deserted from the Austrian army in 1828, went to Turkey, embraced Mohammedanism, and was appointed writing-

master to Abdul Medjid. After crushing revolts among the Albanians and Kurds, he defeated the Russians in the campaign on the Danube (1853-4), being equally successful in the Crimea (1855). After two years of disfavour and banishment (1859-61), he returned to fight successfully against Montenegro (1862), but failed to crush the rebellion in Crete (1867). He was minister of war (1868-9).

Ombre, a Spanish game at cards, played with a pack of forty cards the eight, nine, and ten of each suit being rejected. The order of value of the cards is peculiar, and is different in the two colours. Nine cards are given to each of three players in parcels of three, the two black being always trumps.

Omdurman, tn. on l. bk. of Nile, Egyptian Sudan, opposite Khartum, was the Dervish capital. Here, on Sept. 2, 1898, the Anglo-Egyptian troops, under Lord (then Colonel) Kitchener, defeated the Dervishes, which completely broke the Mahdi's

power. Pop. 48,000.

O'Meara, BARRY EDWARD (1786-1836), Irish physician, served as medical officer in the army, and subsequently on board the Bellerophon. He sailed to St. Helena with Napoleon, in whose dissensions with the governor, Sir Hudson Lowe, he took a vigorous part, and in 1818 was dismissed from his post in consequence. His attacks on Lowe appear in his Napoleon in Exile (1822).

Omen, an event which is supposed to foretell future happenings. From the earliest times a belief in 'signs' as the forerunners of great events has been common, especially in regard to birth, marriage, death. Good or bad fortune is foretold by all manner of trivial events, such as the cracking of a loaf across the top in baking, passing between the carriages of a funeral, a rabbit or squirrel crossing the path when on a journey, seeing a black cat, and so on. Omens good and had are taken from the flight of birds, from insects, and from plants. Marks about the person of babes have their supposed significance. Thus, a straight line on the palm is a token of early death, while white and blue spots on the nails denote good or evil fortune; and from like simple ideas the elaborated art of palmistry arose. Somewhat similar are the popular sayings about the weathere.g. that if St. Swithin's day be wet, it will rain on the forty days following: that the twelve days prior to Christmas indicate the weather of the following twelve months; or that a green Yule and a white Pasque make a full churchyard. See Augur, Divina-TION.

Omentum, a free border of peritoneum (the serous membrane lining the abdomen).

Ommanney, SIR ERASMUS [1814-1904], British admiral, was born in London, and entered the navy in 1826. He took part in the destruction of the Turkish fleet at Navarino (1827), was engaged in Arctic expeditions (1838 and 1850), discovered the first winter quarters of Sir John Franklin's ships (1850), and commanded the naval force in the White Sea and the Gulf of Riga (1854-5).

Ommiades, or Ommayans, a dynasty of Arabian caliphs, founded by Moawiya (661). The seat of power was at Damascus. Defeated by the Abbasides (750). the Ommiades founded the Cordova caliphate in Spain, which

lasted till 1031.

Omnibus, a public conveyance, owes its inception to Pascal of Paris (1662), its name to Baudry of Nantes (1827). George Shillibeer (1797-1866), an Englishman, introduced the idea into London, his omnibus running from the Yorkshire Stingo (Paddington) viâ New Road (Euston) to the Bank (July 4, 1829), fare one shilling. In 1832 the Stagecoach Act was passed, allowing passengers to be taken up and put down gers to be taken up and put down in the streets, and numerous types of omnibuses appeared. The London General Omnibus Company, started under French auspices (1855), bad, in 1857, 595 omnibuses; it became English (1858), and in the half-year ending Dec. 31, 1993, it ran on an average 1,399 omnibuses. The London Road Car Company (with 455 vehicles) introduced outside outside 455 vehicles) introduced outside garden seats,' and the use of tickets. Since 1903 petrol motor vehicles have to a considerable extent taken the place of the horse-drawn bus, and in spite of the objection ble features of noise and the smc of escaping vapours are proving successful. (See London—Traffic.) There are in London 120 different omnibus routes, and over 3,700 omnibuses, requiring from ten to twelve horses each. A bus costs from £150 to £160, and lasts about twelve years. Horses average £30 apiece, and work four or five k30 apiece, and work rour of hours per day for five years. See Moore's Omnibuses and Cabetheir Origin and History (1902).

Omnium, JACOB. See HIG-GINS, MATTHEW J.

Omphacite, a pale green variety of pyroxene which occurs in the rock known as eclogite.

Omphale, in ancient Greek legend, wife of Tmolus, king of Lydia, after whose death she reigned as queen. As an atonement for the murder of Iphitus, Hercules had to become her servant for a period of three years,

Omphalea, a genus of tropical shrubs or trees, order Euphorbiacee. They bear monœious, apetalous flowers, followed by thick fleshy fruits with hard centres. The Jamaica species, O. triandra, is the only one cultivated in Britain. It is a stove tree about ten feet high, with yellow fruit and cordate leaves.

Omphalodes, a genus of hardy herbaceous plants, order Boraginaceæ. They bear loose raceines of whitish or bluish flowers, followed by fruits containing four cup-shaped seeds. The species are of easy cultivation in ordinary garden soil, and thrive in partial shade. Among the best species are the annual O. linifolia, Venus's navelwort.

Omsk, the cap. since 1882 of the general gov. of the Steppes, Russia, N. Central Asia, at the junction of the Om and the Irtish. It contains a cathedral, governorgeneral's palace, and fortress. The industries include brick and pottery works, breweries and distilleries, tobacco, oil, and soap manufactories. The climate is very cold. Pop. 53,050.

On. See HELIOPOLIS.



Onager.

Onager, a variety of the Asiatic wild ass (Equus hemionus), also called ghorkhar, found in Western India and Baluchistan. It is pale in colour, has a broad dark stripe down the back, and is a somewhat smaller animal than the kulan. It is extraordinarily fleet, and cannot be overtaken by a horseman. The flesh is sometimes eaten by the Persians.

Onagraces, an order of mostly herbaceous plants, chiefly natives of temperate regions of Europe and America. The flowers are generally composed of four sepals (the calyx-tube being attached to the ovary), four fungacious petals, four stamens, and a two or four celled ovary. The fruit is commonly an edible berry. Among the genera are (Enothera, Fuchsia, Epilohum, Circea, Isnardia, and Gaura.

Oncidium, a genus of tropical epiphytal orchids, of which a very large number of species are cultivated in English stovehouses.

They bear mostly yellow flowers in long racemes or spikes. native haunts vary considerably as to temperature, moisture, and exposure to sunlight. Probably the most beautiful of the Oncidiums are those that thrive under the same treatment as the cool Odontoglossums. There are many differences in the habits of the species. Some, such as O. lanceanum and O. hamatochilum, are distinguished by large fleshy leaves and the absence of pseudo-bulbs. O. jonesianum and O. Cebolleta have terete fleshy leaves; while a few species, as O. pulchellum and O. triquetrum, have nearly equitant foliage. O. macranthum and its allies produce long, shortly-branched flower-spikes, which often exceed ten feet in length. O, macranthum is undoubtedly one of the handsomest orchids grown. O. Papilio is one of the most remarkable orchids ever introduced into Britain, the flowers bearing a fanciful resemblance to the antennæ and proboscis of a butterfly. All of the Oncidiums are apt to weaken themselves by over-flowering. The strong-growing varieties should be placed in pots; while for the dwarfed kinds shallow teak-wood baskets or pans are preferable, so that they may be hung near the roof glass. When growing, Oncidiums require abundance of moisture, but after growth is completed less will suffice.

Onega. (1.) Town and port, Archangel gov., N. Russia, 84 m. s.w. of Archangel city, on the Onega R. It has sawmills, ship and boat building, fisheries, and timber trade. Pop. (1897) 2,694. (2.) The most southerly gulf of the White Sea, penetrating inland (to S.E.) about 95 m., with a breadth of from 32 to 45 m., and an area of over 6,500 sq. m. (3.) A lake of N. Russia, in Olonets gov., 75 m. E.N.E. of Lake Ladoga, with which it is connected by the Svir. Its area amounts to 3,900 sq. m.; its extreme length is 140 m., its breadth 48 m.; its mean depth is fully 525 ft. Fisheries prosper. (4.) A river of N. Russia, flowing into the White Sea, and quite unconnected with Lake Onega. It rises in Olonets gov. Its length is 240 m. Salmon and lamprey fishing exists on the lower river.

Oneglia, tn., Italy, on Gulf of Genoa. It exports oil, wine, and fruit. Pop. (1901) 8,527.

Onehunga, the w. port of Auckland, New Zealand (from which it is 7 m. by rail), on Manukau harbour. Has a timber trade, and manufactures woollen goods. Pop. (1901) 3,015.

Pop. (1901) 3,015.

Onelda. (1.) Town, Madison co., New York, U.S.A., on Onelda Creek,5 m. from lake of same name;

has engine and wagon works, and furniture and hosiery factories. In the vicinity are the ancient castle of the Oneida Indians and the Oneida community established by John H. Noyes in 1847. Pop. (1900) 6,364. (2.) Lake of central New York, of glacial origin. It finds an outlet through Oswego R. to Lake Ontario.

O'Neill, ELIZA (1791-1872), Irish tragic actress, achieved a marked success on her appearance in London as Juliet in 1814. She was regarded as the successor of Mrs. Siddons. In 1819 she married William (afterwards Sir William) Wrixon Becher, and quitted the

stage

O'Neill, Hugh. See Tyrone.
O'Neill, Shane (d. 4567), Irish chief and rebel, was the son of Con Bacagh O'Neill, to whom Henry VIII. granted the earldom of Tyrone, with remainder to Matthew, his illegitimate son. On the death of the earl, the O'Neills chose Shane, his legitimate son, to be his successor; but the English government supported Matthew. The latter was eventually murdered by Shane, who conducted a perpetual warfare against Matthew's heir and the government.

Onesimus, St., one of St. Paul's disciples, suffered martyrdom A.D. 95. February 16 is dedi-

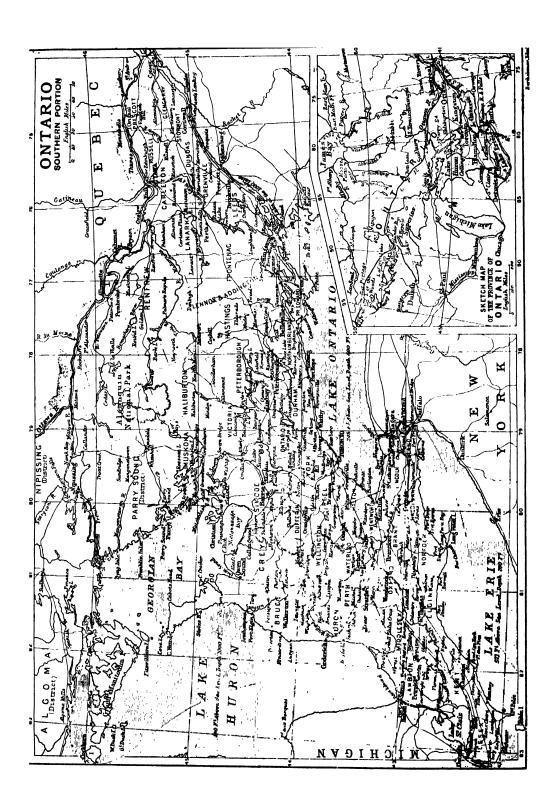
cated to him.

Ongaro, Francesco Dall' (1808 - 73), Italian writer and patriot, was born in prov. Treviso; settled at Trieste as a journalist (1836). Forced to leave Trieste (1847), he continued his propaganda at Venice and Rome, where he organized Garibald's first Italian legion. After a period of exile he returned to Italy (1859), and became professor of literature at Florence, and then at Naples. Of his numerous works (plays, novels, etc.) only the effective stornelli have any reputation. They were republished at Milan in 1883, with an article by Howells translated from the North American Review. See monograph by Mongeri (1873), and the Epistolario Scelto, etited by De Gubernatis (1875).

Ongole, tn., Nellore dist., Madras Presidency, India, 74 m. N. of Nellore; a centre of mission

work. Pop. 11,000.

Onion (Allium cepa), a member of the order Liliaceæ. The common onion has been found wild in Baluchistan and the countries adjoining, whilst the spring onion has been discovered wild in Siberia, leeks in Algeria and many other places, and chives throughout Europe and N. America. The onion was introduced into England at a very early period, though the shallot and the spring onion were not grown before the sixteenth century. Land soon



'sickens' of onions, therefore a frequent change of quarters for the crop is to be desired. Kainit spread on land cropped with onions, at the rate of 5 cwt. to the acre, is very useful. The soil intended for the onion cropshould be moderately rich, should be deeply dug early in the winter, and in bebruary should be made fine and rolled or trodden very firm.

About the end of February, sow spring onions in shallow drills about ten inches apart, sowing thinly rather than thickly. As soon as the seedlings are up, the surface between the drills should be broken by hoeing, and, as soon as may be, thinning should be performed. Autumn onions should be sown at about the end of July. Early in the following March they are transplanted in rows twelve inches apart, nine inches being left between the plants. Onions benefit much by occasional topdressings of soot or nitrate of soda during the period of growth.

Onkilon, a division of the Eskimo family, formerly inhabiting N.E. Siberia, about East Cape on Bering Strait. They are understood to have been nearly exterminated by Chukche invaders about three centuries ago. Their mound-dwellings, with their stone axes and chisels, slate knives, and spear-heads of bone and slate, are described by Baron Nordenskiöld in his Voyaye of the 'Vega' (1881).



Onobrychis sativa (Saintfoin). 1, Keel; 2, wing; 3, pod.

Onobrychis, a genus of herbaceous and sub-shrubby plants; order Leguminose. They bear spikes or racemes of purplish or white flowers, followed by semiorbiculate pods, and imparipin-nate leaves with entire, exstipu-They are of easy late leaflets. culture in ordinary sandy loam, some requiring greenhouse temperature. O. sativa is the common saintfoin, the only species native to Britain.

Onoclea, a genus of hardy ferns, easily cultivated in ordi-nary, fairly rich garden soil. The two best-known species are the N. American O. sensibilis, with a creeping rootstock, deeply-pinnatifid sterile fronds, and bipinnate fertile fronds; and the ostrich fern, O. germanica, with broad lanceolate fronds and graceful habit.

Onomacritus, an Athenian, who flourished 520 to 485 B.C. He was a teacher of the Orphic religion, and is said to have assisted in preparing a new edition of Homer, into which he may have interpolated the account of Odysscus's visit to the lower world. Another interpolation into a collection of oracles ascribed to Musæus is said to have led to his banishment from Athens.

Onomatopæia, in philology the formation of a name or word by an imitation of the sound associated with the thing or action designated—as 'whizz.'
Onomichi, seapt. in prefecture

of Hiroshima, S. Hondo, Japan, 125 m. s.w. of Kobe, has manufactures of fancy mats. There are two fine old temples. Pop. 22,312.

Ononis, a genus of mostly herbaceous plants, order Legumi-nosæ, marked by having a fivecleft calyx, the segments of which are very narrow, a beaked keel, a threadlike style, and a swollen, few-seeded legume. O. arvensis, the common English rest-harrow, is a native of barren, dry ground. The spreading rest-harrow, O. reclinata, is a rare Irish native.

Onopordon, a genus of hardy herbaceous plants, order Compositæ, characterized by large purple or white flower-heads, with fleshy, honeycombed receptacle, hairy, rough pappus. The bestknown species is the common Scotch thistle or cotton thistle. It is of stately habit, has woolly stems and leaves, and bears large purple flowers.

Onoseris, a genus of herbs and shrubs, order Composite, mostly natives of S. America. They are easily cultivated in welldrained soil containing a fair proportion of leaf-mould.

Onosma, a genus of hardy herbs and sub-shrubs, order Boraginaceæ, bearing cymes or racemes of tubular flowers, generally yellow in colour. They thrive in deeply dug, well-drained, light garden soil. Onslow, WILLIAM HILLIER,

FOURTH EARL OF (1853), became

under-secretary for the Colonies in 1887, and subsequently served as parliamentary secretary to the Board of Trade (1888-9); governor and commander-in-chief of New Zealand (1889-92); under-secre-tary for India (1895-1900); under-secretary for the Colonics (1900-3); president of Board of Agriculture (1903); and chairman of mittees, House of Lords (1905).



Ononis arvensis (Rest-Harrow). 1, Fruit.

Ontario. (1.) The premier prov. of the Dominion of Canada, is bounded s. and w. by the St. Lawrence River and the Great Lakes. It stretches N. to James It has Bay and W. to Manitoba. It has an area of 222,000 sq. m. (not including the portions of the Great Lakes within the territorial limits of Canada); its greatest length is 750 m., its greatest breadth 250 m. The surface is undulating, and there are no consider-able ranges of hills, although the Laurentian Hills continue W. till they strike Lake Huron, and there is a watershed of elevated land separating the basins of the Ottawa and the St. Lawrence. The principal rivers are the Ottawa, which separates it from Quebec, and the St. Lawrence, which is the boundary between Ontario and the United States; and the chief rivers which traverse the province are tributaries of the Ottawa. In the s. half of the province there are no large lakes, but in the w. half are Lakes Nipigon, Nipissing, and others. The natural resources of the province are very great. It is very fertile, and has immense mineral wealth. Iron occurs in many places, in great abundance

in the region to the N. of Lake Superior. Coal, however, is absent, and Ontario depends partly on Nova Scotia and partly on the coal fields of the United States. Since the regions N. of Lake Superior were opened up, gold and silver have been mined in increasing quantities. There are large petroleum wells in the county of Lambton. The settled and agricultural portion of the province lies to the s. of the Laurentian Hills. Forty-six per cent. of the surface is still covered with forest, and the provincial government derives one-fourth of its revenue from its woods and forests. Agriculture is the great industry of Ontario, and it is well suited for the production of every crop which can be raised in a temperate climate. Maize, grapes, tomatoes, peaches, and tobacco grow freely in the open Toronto (pop. 208,040) is the only large city, but there are in the s.w., within a compara-tively limited area, more than fifty towns with a population exceeding 5,000.

More than half the capital invested in manufacturing in Canada is operated in Ontario. chief articles produced are farm machinery, carriages, railway rolling stock, cottons and woollens. leather goods, and furniture. The settled portion of the province is covered with a perfect network of railways. During the open season the traffic by water is very great, and is largely due to the excellent canal system which has overcome the natural obstacles in the great waterways of the

province. The school system of Ontario is administered by a minister of education, and is supported by a provincial grant and a tax on property. The educational system runs right up from the elementary schools to the University of Toronto, and all the different parts are correlated. Pop. (1901) 2,182,947.

The administration is in the hands of a lieutenant-governor, assisted by an executive council and a legislative assembly of ninety-four members; and there is an admirable system of local and municipal government. The revenue exceeds the expenditure, and, what is unique among civilized states, there is no public debt. The province is represented in the Dominion parliament by twenty-four senators and eightysix members of the House of Commons. The province contains many points of interest to the tourist, and it has of recent years become a great resort for sportsmen from all countries. For history of the province, see CANADA.

(2.) One of the great lakes of

N. America and the lowest in the series, being connected with Lake Erie by the Niagara R., and drained by the St. Lawrence, the boundary line between the United States and Canada traversing the lake. Altitude, 247 ft.; area, 7,260 sq. m., and the area of its watershed, including the surface of the lake, is 32,980 sq. m.

Valencia Ontentiente, tn., Valencia prov., E. Spain, on r. bk. of Clariano, 45 m. s.w. of Valencia; manufactures paper, linen, and woollen goods. Pop. (1900) 11,441.

Ontology, the term formerly

used to denote the most general part of metaphysics in which the more general or fundamental philosophical conceptions, such as possibility, necessity, causality, etc., were explained. According to the 18th-century philosopher Wolff, metaphysics was subdivided into (1) ontology, and (2) the three more concrete parts, cosmology, psychology, and natural theology, in which nature, spirit, and God are the objects respectively treated of. And the division into ontology, cosmology, and psychology is still used by some recent philosophical writers -c.g. Lotze. By Aristotle meta-physics, or first philosophy, was defined as the science that treats of being as being, and thus corresponds to ontology in the above scheme. But the term ontology is often applied to metaphysics generally, and is sometimes used to imply empty speculation in a region beyond the reach of real knowledge. See PHILOSOPHY.

Onus Probandi, or the burden of proof. The most general rule is that the question at issue must be proved by the party who asserts the affirmative. See EVIDENCE.

Onychium, a genus of ferns of which two species are cultivated in Britain. O. auratum is a stove fern with golden sori and involucres, and quadripinnatifid fronds; O. japonicum is a nearly hardy fern with brown sori. Onychiums require a light, well-drained soil containing peat.

Onyx, a banded variety of agate (sp. gr. $2^{\circ}6$, h. = 7), in which the colours are arranged in nearly straight and parallel stripes. The commonest colours are gray or dark gray and white, but red, yellow, black, and green also occur, and many specimens have their colours modified or enhanced by artificial staining. Onyx is used for ornaments, and in ancient times was the material out of which many fine cameos were cut. Of late years a stone, known as onyx, but really a banded green, gray, and white variety of marble, has become popular in the manufacture of clocks and vases.

Oodeypore. See Unaipur.

Oogonium, the organ which contains the oosphere, or female gamete, in the Alge and Fungi; usually a more or less spherical sac, without any differentiation into neck and venter.

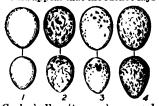
Oojein. See UJJAIN. Ookiep. See CAPE COLONY.



Section of Volite.

Oolite, a limestone composed of small, rounded grains resem-bling fish roe, and common in the Jurassic rocks of Britain. When the grains are larger, the formation is also known as Peastone and Pisolite. The same structure is found in Carboniferous and Silurian limestones, in the calcareous sands forming deposits on the beaches of some coral islands, and in the precipitates of petrifying springs (e.g. Karlsbad). In microscopic section, the colitic grains consist of concentric layers, each of which has an obscure fibrous or radiate structure. The formation of colites is probably caused by small, coiled, tubular algae, which abstract the limesalts from sca-water and deposit them in their cell-walls. Oolitic limestones are richly fossilifer-ous. A seam of good coal occurs in the Lower Oolite at Brora, Sutherlandshire.

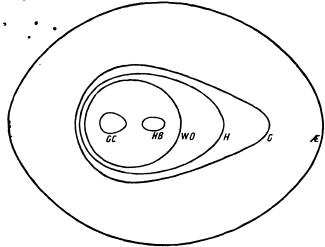
Oology, the science which deals with the eggs of birds. In the article EGG the general charac-ters of the eggs of birds are discussed. The oologist is concerned with the external characters for the most part—c.g. the size and shape of the cgg, the number in a clutch, and the colour and texture of the shell. Of all birds it would appear that the cuckoo lays



Cuckoo's Eggs (top row) compared with the cygs of the birds in whose nests they were laid. Redstart, 2. Cirl bunting, 3. Orphean warbler, 4. Meadow pipit.

proportionately the smallest egg, a fact probably in some way related to the parasitic habit of the bird. As to absolute size, the egg of the extinct Æpyornis of Mada-gascar measured three feet in circumference and held two gallons, while that of the gold-crested

wren only measures half an inch along its longer diameter, and that of the humming-bird is much smaller. The shape of the egg varies greatly. The eggs of owls are nearly circular, those of hummingthe case of the cuckoo there is a frequent resemblance between the colour of the egg and that of the eggs of the bird victimized. In texture the egg is sometimes smooth like porcelain, sometimes



Comparative Forms and Sizes of Eggs.

A. Epyornis maximus; a. guillemot; H. hen; wo, wood owl; ac, gold-crested wren; HB, humming bird (Lophornis magnificus). (The egg of æpyornis is drawn to half the scale of the others.)

birds are oval at both ends, while perhaps the commonest shape is that in which one end is narrower than the other, as exemplified in the egg of the hen. The significance of this shape is that it allows the eggs to be so arranged in the nest that they occupy the minimum of space. Such birds as the guillemot and its allies lay pear-shaped eggs; in these cases the egg is laid on a flat rock, from which it would be apt to roll if it possessed the or-dinary egg shape. The number of eggs in a clutch is, generally speaking, constant for the species, but shows great variation in related species. Not a few birds lay only one egg, while game-birds often lay a dozen or more. Even so small a bird as the great tit has been known to lay twelve eggs in one clutch. Where the egg is concealed it is usually white in colour, like the reptilan egg; where exposed it is often brightly coloured, usually with spots or splashes of bright colour on a paler ground. Sometimes there is much uniformity of egg colouring throughout a family: for instance, splashes of reddish colour on a pale-bluish ground is a common type among the thrushes, but within the thrush family we have also proofs that very different types of colouring may occur among nearly related forms. In some cases the egg strongly resembles the surroundings, as in sandpipers and plovers, and in chalky, and sometimes pitted as in the egg of the emu. See Gordon's Eggs of the Native Birds of Britain (1905), and Ootheca Wolleyana, ed. A. Newton (1864-1905).

Oosterhout, tn., N. Brabant, Holland, 5 m. N.E. of Breda; has sugar refineries, iron foundries, and tanneries. Pop. (1899) 11,545.

Oosterzee, Jan Jakob van (1817-82), Dutch theologian, occupied the chair of theology at Utrecht. Among his works are Theology of the New Testement (1867; Eng. trans. 1870), Christian Dogmatics (1872; Eng. trans. 1874), Practical Theology (Eng. trans. 1878), and a Life of Christ (1846-51).

Ootacamund. See Utaka-Mand.

Ooze, a term applied to certain deposits found on the floor of the ocean, which consist, in large part at least, of the hard parts of pelagic organisms. The most abundant is globigerina ooze. Globigerina is a member of the Foraminifera, and hears addicate calcarcous shell. The organisms live at the surface, and as they die their shells fall in a ceaseless rain to the sca-bottom. This ooze does not occur near the shore, where the deposits consist mainly of land-derived materials; and in polar regions it is replaced by distom ooze, which is largely formed of the siliceous frustules of diatoms. There is, however, no sharp line of demaration be-

tween the so-called blue muds, or land-derived deposits, globigerina ooze. and diatom ooze. When ooze, and diatom ooze. the depth exceeds three thousand fathoms, globigerina coze is re-placed by a non-organic deposit known as red clay. When, however, depths of more than four thousand fathoms are sounded. the deposit contains the siliceous shells of Radiolaria, and is known as radiolarian ooze. It is believed that the explanation of this somewhat curious distribution of the organic oozes is as follows:-Calcium carbonate is soluble in seawater, the solubility apparently increasing with the depth. As the shells of the Foraminifera sink they undergo a gradual process of solution, until at depths exceeding three thousand fathoms they completely disappear. The débris of dissolved shells, with volcanic dust and so forth, constitutes the red clay, which contains a certain proportion of Radio-laria and other siliceous organ-isms. The Radiolaria, unlike the Foraminifera, do not live at the surface, but at all depths.

Opah. See SUN-FISH.

Opal, an amorphous or noncrystalline form of silica, usually
containing a variable percentage
of water (sp. gr. 2, h. = 6). It is
always a secondary mineral, resulting from the decomposition of
the primary ingredients of rocks,



Types of Ooze.

1. Globigerina coze.
2. Diatomaceous coze.
3. Radiolarian coze.

especially the felspars, and is found in the crevices and cavities

of volcanic lavas, such as trachyte, or in tuffs, often gradually re-placing the mass of igneous rock. In Queensland precious opal occurs in veins in a brownish sand-stone. Opal is also a petrifying agent which may permeate fossil wood, corals, shells, etc., preserving even the minute structure of the organic remains, while the original substance has been entirely carried away in solution. Wood opal has the grain of wood and a variety of colours, and makes a handsome ornamental stone, suitable for vascs and other decorative articles. Precious opal is obtained in Hungary, Mexico, Guatemala, New South Wales, and elsewhere. In a gray or white matrix it contains very fine cracks, which, in reflecting light, produce a striking play of col-ours known as opalescence. As a gem it is always polished with a rounded surface (en cabochon), and is usually set with diamonds or pearls. Opals, if not taken care of, may lose their brilliance and surface polish, as they are not so hard as most precious stones. Hyalite is a clear, glassy variety of opal, never opalescent, though often faintly iridescent. Fire opal, which comes from Mexico, is yellowish red, with a marked opalescence. Hydrophane is a porous, translucent opal, which on being placed in water becomes nearly transparent as the water is absorbed into the pores

Opata-Pima, one of the main divisions of the North American aborigines. The northern (Pima) section is settled in Arizona, and numbers about 9,600. The southern (Opata) section belongs to the Mexican states of Sonora, Sinaloa, Jalisco, Zacatecas, Durango, and Chihuahua, with a total population (1900) of from 70,000 to 80,000.

Op. Cit. (opere citato), 'in the work quoted.'

Open Spaces. The enclosure of commons in England was greatly facilitated by the Inclosure (Consolidation) Act, 1801, and subsequent acts; but the Inclosure Act of 1845 prohibited the enclosure of village greens, and provided that in the case of enclosure allotments might be made for exercise and recreation grounds; and this provision was extended by the Commons Act, 1876. This act also made special regulations with regard to suburban commons, or commons within six miles of a town of five thousand inhabitants, for the benefit of the population of the town. The Metropolitan Commons Acts, 1866, 1869, and 1878, prevented the enclosure of commons lying wholly or partly within the Metropolitan Police District (roughly, fifteen miles from Charing Cross), and under these acts many large

commons in the neighbourhood of London have been preserved as open spaces for the public.

By the Towns Improvement Clauses Act, 1847, the commis-sioners under the act were given power to purchase or rent lands in their district or within three miles of the centre of it, to be used as a pleasure-ground or place of public resort and recreation. Urban authorities generally, outside London, obtain similar powers under the Public Health Act, 1875; and these are also conferred upon the London County Council by the Open Spaces Act, 1887. By the Metropolis Management Act, 1856, s. 11, the vestries and district boards (now the Metropolitan Borough Councils) are given power to take land by agreement or gift for open spaces, and to pay for their improvement and management out of the rates. Most of the London parks, other than royal parks, have been purchased and are regulated and maintained under the authority of private acts obtained under last - quoted act. By the Public Improvements Act, 1860, parishes with a population exceeding five hundred were empowered to purchase or lease or accept gifts of land for forming a public walk, exercise or play ground. and to levy a rate not exceeding sixpence in the pound for main-taining it. The right to adopt the act in rural parishes is transferred to the parish meeting by the Local Government Act, 1894; and the same act gives additional powers to parish councils to acquire land for similar purposes. Enclosed gardens in towns set apart for the use of adjoining residents, which have existed for fifty years and are in a neglected state, may be vested in the town council, or in London in the county council or the city corporation, under the Towns Gardens Protection Act, 1863. Under the Open Spaces Acts, 1871 to 1890, the county council and the borough councils in London, and urban district councils elsewhere, may acquire open spaces, enclosed or unenclosed, by purchase or gift, and hold them in trust for the use of the public. The acts contain provisions enabling trustees and other managers and owners of open spaces to transfer them by agreement to local authorities. Disused burial-grounds, both in London and in urban districts throughout England, may be transferred to local authorities as open spaces, subject to certain conditions as to the removal of tombstones, and restrictions as to the playing of games. The provisions of the Open Spaces Acts may be extended to rural districts by an order of the Local Government Board. Under the

Metage on Grain (Port of London) Act, 1872, and subsequent acts, the corporation of the city were empowered to employ certain moneys arising from grain duties in the purchase of open spaces outside the county of London, but within twenty-five miles of it; and Epping Forest, Burn-ham Beeches, Coulsdon Commons, and other open spaces have been purchased under these acts

Where the Public Health Act. 1890, has been adopted, the local authority may close parks and pleasure-grounds to the public on not more than twelve days in a year, and not more than four consecutive days, and may grant the use of them gratuitously or otherwise for public charities or institutions, or for agricultural or horticultural shows or other public purposes, and they may provide, or license others to provide, boats on lakes in the parks. The London County Council has similar powers under a private act of 1895. Land given for the purpose of public parks is exempted from the Mortmain Acts.

In Scotland, under the Public Parks (Scotland) Act, 1878, the local authority of any burgh may purchase or take on lease, lay out, improve, and maintain lands for the purpose of being used as parks, public walks, or pleasure-grounds, and may support or contribute to the support of parks, etc., provided by others, and may make by-laws for their regula-tion. Under the Burgh Police (Scotland) Act, 1892, the commissioners may provide lands and grounds for public recreation in or within two miles of the burgh. Their powers are not to affect the powers conferred by the Act of 1878. They may also accept the management of parks and open spaces in or near the burgh, and spend money in maintaining them or defending public rights in them. Under the Local Government (Scotland) Act, 1894, s. 24, a parish council has power to provide and maintain grounds for public recreation; and by s. 43 heirs of entail are empowered, subject to certain consents, to give land belonging to the entailed estate, not exceeding twenty acres, to be used for public recreation.

In Ireland, under the Public Parks (Ireland) Act, 1869, as amended by the Act of 1872, the governing body of any town with a population exceeding six thousand may establish and maintain public parks within or without the town for the use and enjoyment of the inhabitants, and may levy rates for maintaining them.

Opera, a secular musical drama performed with scenic effects and a full orchestral accompaniment. An opera may consist of one or more acts, divided into a variable number of scenes, interspersed with instru-mental interludes; ballets are also frequently introduced into certain forms of opera. The story of an opera—termed its libretto—may be told in the form of solos, recitatives, duets, quartets, choruses, etc., the action of the piece being usually preceded by an orchestral introduction termed its overture. The modern lyric drama originated at Florence about the close of the 16th century. The first composition which attracted public attention was a musical setting by Peri and Caccini of the story of Orpheus and Eurydice, the libretto for which was written by Rinuccini. This work was composed for the marriage of Henry IV. of France to Maria de' Medici, and, under the title of *Euridice*, was produced in Florence in 1600. It was written in the modern monodic style of composition. The importance of this new art form was at once recognized, and soon nearly all Italian composers devoted their energies to the cultivation of dramatic music; but before the close of the 17th century the lyric drama had numer-

ous exponents in Figure , many, and England.

In Italy, Monteverde (1568-1643) was the first to eclipse the success of Peri and Caccini. In latter part of the 17th the latter part of the 17th century the name of Alessandro Scarlatti (1659-1725), the founder of the Neapolitan school of opera, takes highest rank. Although for several generations dramatic music was more cultivated in Italy than in other countries, Il Matrimonio Segreto of Cimarosa (1749-1801) is the only Italian operatic work, produced before the close of the 18th cen-tury, which is still performed. The operas of Cherubini (1760-1842), Spontini (1774-1851), and other composers were all overshadowed by the appearance of those by Rossini (1792-1868). The most famous followers of Rossini have been Donizetti (1797-1848), Mercadante (1797-1870), Bellini (1802-35), and Verdi (1813-1901), who ranks next to Rossini. Perhaps the best-known living Italian operatic composers are Leoncavallo and Mascagni. In Italian opera, both in its serious and in its lighter forms-opera seria and opera buffa-beautiful flowing melody is a predominating feature; spoken dialogue is excluded, and the words of the libretto are sung throughout to orchestral accompaniment.

The founder of the French school of opera was J. B. Lulli (1633-87), a native of Florence, who went to Paris and became the favourite musician of Louis

XIV. The earliest French operation composers of note were Rameau (1683-1764), Grétry (1741-1813), and Méhul (1763-1817), but their works are now seldom heard. Their most celebrated successors whose works still hold the stage have been Boieldieu (1775-1834), Auber (1784-1871), Berlioz (1803-69), Ambroise Thomas (1811-96), Bizet (1838-75), and Gounod (1818-93). Living French operatic composers who rank high in public estimation are Saint-Saens (1835) and Massenet (1842). During the latter part of the 18th century France became universally regarded as the country in which the merits of operatic composi-tions were most fully recognized, and numerous composers of other nationalities paid lengthened visits to Paris. Amongst these were Cherubini, Spontini, Rossini, Donizetti, and Bellini (Italian); Gluck, Meyerbeer, and Flotow (German). French opera Bellini grand is a development of Italian opera seria, but in the former orchestration does not, as in the latter, take a subordinate position, its skilful treatment being regarded as an essential feature of the work. French opéra comique does not signify that its subject must necessarily be of a comic or humorous nature; the element of tragedy may even be introduced, but its dénouement must be happy; spoken dialogue may also be used—a licence which is not permitted in grand opera. Celebrated expenses of Expenses of the control of the amples of French grand opera are Rossini's William Tell (1829), Meyerbeer's Les Huguenots (1836) and Le Prophète (1849), and Berlioz's Benvenuto Cellini (1838).

In Germany, performances of Italian opera were inaugurated early in the 17th century, but the first true German opera-Theile's Adam and Eve-was produced in Hamburg in 1678, and the first German operation composer of outstanding merit was Keiser (1673-1739). Gluck (1714-87) is the next name of importance, and his efforts to regenerate grand opera mark an epoch in the history of dramatic music. Mozart (1756-91) was recognized as the greatest operatic composer of his generation. What is termed the romantic school of opera, the libretto in which is founded upon some incident of a mythical, legendary, or supernatural character, had its origin in Germany. Mozart's Magic Flute (1791) and Spohr's Faust (1818) belong to this class, but the operatic works of Weber (1786-1826)—Der Freischütz (1820), Euryanthe (1823), and Oberon (1826)-are those most intimately associated with the inauguration of romantic opera. Other well-known operatic works

in this form are those by Marschner, Schubert, Mendelssohn, and Schumann. Wagner, the creator of the music drama, was the most famous representative of the romantic school of opera, and one of the greatest musical geniuses of the 19th century. Melodrama, in its form of spoken language, accompanied by instrumental music, was first used in opera by the German composer Benda (1721-95), and the best example of its treatment is that in the 'grave-digging' scene in Beethoven's only operatic work—Fidelio (1805).

English opera came into existence about the middle of the 17th century, and owed its inception to an evolution of the masque; but the numerous dramatic works of rare excellence by Henry Purcell (1658-95) were the first which gave definite form to English operatic compositions. Unfortunately, the development of dramatic music was much retarded in England by the popularity of Handel and of various Italian composers. Pepusch's Beggur's Opera (1728) was the most pop-ular English operatic work produced before the beginning of the 19th century. Since then English operatic compositions have been extremely numerous, amongst them Balfe's Bohemian Girl (1843), Wallace's Maritana (1845), Sullivan's brilliant comic operas, Patience (1881), Iolanthe (1882), The Mikado (1885), etc., also his grand opera Ivanhoe (1891), Goring Thomas's Esmeralda (1883), Mackenzie's Colomba (1883), and Villiers Stanford's Canterbury Pilgrims (1884). See Hogarth's Memoirs of the Opera (1851).

Opera-glass. See FIELD-GLASS.

Opercularia, a genus of Australian herbaceous plants belonging to the order Rubiaceæ. They bear small white flower-heads in summer. Opercularias are sometimes cultivated in English greenhouses; they require a peaty soil containing plenty of leafmould.

Ophicleide, an obsolete brass wind instrument developed about the beginning of the 19th century from an ancient wind instrument called the serpent. It had a bell bottom, conical tube, and cupped mouthpiece, and usually contained eleven keys. Alto and double-bass forms of the instrument were constructed; but it was usually set in C, and had its music written in the bass clef.

Ophidia. See SNAKES.

Ophioglossum, a genus of ferns with sessile sporangia arranged in two rows so as to form a spike.

Ophiolatry. See SERPENT-WORSHIP.

Ophiopogon, a genus of herbaceous plants belonging to the order Hæmodoraceæ, with raceines of whitish flowers and linear

leaves.

Ophir, Land Of, the country from which the navies of Solomon and Hiram brought gold and precious stones. Opinions differ as to its geographical position. Gen. 10:29 points to S. Arabia as the locality. Other views are that it was in Mashonaland, in Ceylon, and on the Malabar coast of India. See Keane's Gold of Ophir (1901).

Ophir Wine, a red Australian wine of the Pommard Burgundy type, possessing many of the best qualities of French wines.

Ophites. See GNOSTICISM.
Ophitic Structure in rocks is found when one mineral (e.g., felspar) in sharply-formed crystals is enclosed in large irregular masses of another (e.g. augite), It is very typical of dolerites and diabases.

Ophiuchus, an ancient constellation stretching across the equator from Hercules to Scorpio, and generally identified with Æsculapius. The binary system, 70 Ophiuchi, has a period of 88 years, a parallax of 0'16", and a mass 14 times the solar. Periods of 234 and 218 years have been assigned to \(\lambda\) and \(\tau\) Ophiuchi respectively. One of Burnham's close couples is η Ophiuchi; and ρ, also double, lies in the 'wonderful nebulous region' centred about θ Ophiuchi, photographed by Barnard in 1895. Three Novæ have appeared in this constella-tion—that of 123 A.D.; Kepler's, 1604; and Hind's, April 28, 1848. The western branch of the divided Milky Way traverses the feet of Ophiuchus.

Ophiuroidea. See BRITTLE-

STARS.

Ophrys, a genus of hardy terrestrial orchids with three sub-equal senals and two entire petals. The bee orchis (0. apifera) and the fly orchis (0. muscifera) are natives of Britain, occurring in limestone and chalky districts. These can be cultivated in the rock garden.

Ophthalmia, a general term for inflammation of the eye. See

EYE

Ophthalmoscope, the instrument specially constructed to aid in minute examination of the eye, and particularly its interior. It consists of a small mirror, pierced in its centre by a small circular perforation. Concave and convex lenses are used with it. The person whose eye is to be examined sits facing the examiner, an artificial light being placed slightly behind the patient. The examiner, looking through the central aperture of the ophthal-

moscope, reflects light from its mirror surface into the eye under examination, the room being dark except for the one light used, which is preferably gas or electric light. In the direct method the light is reflected

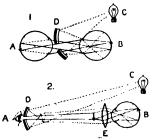


Diagram showing course of rays in (1) direct and (2) indirect ophthalmoscopy.

A, Observer; B, patient; c, source of light; D, mirror; E, lens.

directly from the mirror to the fundus or back of the eye, though lenses may be used behind the mirror, between it and the examiner's eye, to correct any errors in vision in the eye of either examiner or patient. In the indirect method a bi-concave lens is held between the ophthalmoscope and the patient's eye. Atropine, or some other pupil dilator, is often used before examination.

Opie, AMELIA, née ALDERSON (1769-1853), English author, married in 1798 to John Opie the painter. Among her novels are The Dangers of Coquetry, and Father and Daughter (1801), Adeline Mowbray (1804), and Madeline (1822). She also published poems and songs. Her work, which is of the domestic type, had a considerable vogue. See Brightwell's Memorials of the Life of Amelia Opie (1854).

Ople, John (1761-1807), English painter, born at St. Agnes, Cornwall. Encouraged by Dr. Wolcot (Peter Pindar), he went in 1780 to London, where his talent was immediately recognized, and his Assassination of David Rizzio (1787) procured his election to the Royal Academy. Excellent examples of his strength, freshness, and spirited execution are his Mary Wollstonecraft Godwin, William Godwin, and William Siddons (National Gallery).

Opimius, Lucius, consul at Rome in 121 B.C., when he led the senatorial party against Gaius Gracchus, and caused the latter's death; subsequently he presided over a commission which executed three thousand of Gracchus's followers. In 116 he was sent out to Africa to apportion the

kingdom of Numidia between Jugurtha and Adherbal, and was afterwards (110 B.C.) convicted of having taken bribes from Ju-

Opitz, Martin (1597-1639), German poet, was born at Bunzau; was made historiographer to the king of Poland. He became, at an early age, the recognized leader of German poets. His Buch von der deutschen Poeterei (1624), based in the main on the theories of the French Pléude, came to be accepted as the poets handbook. He was also largely responsible for the introduction of pastoral' novels and of the Italian opera. Opitz is generally called the leader of the first Silesian school. The fullest edition of his works, in 3 vols., appeared in 1690. See Strehlke's Martin Opitz von Boberfeld (1856).

Opium is the inspissated juice obtained from the unripe capsules of the white poppy (Papachiefly in Asia Minor, India, and China. The milky juice is collected, air-dried, and made up into cakes, ball, or bricks. Opium from Asia Minor is mostly imported into Britain, and occurs in rounded masses of reddishbrown colour and narcotic odour. It contains numerous alkaloids. of which morphine is by far the most important, and is the one to which the main action of the drug is to be ascribed. Of the other alkaloids, narcotine, codeine, and thebaine are the ext in importance. Opium is prepared in the form of extracts, pills, powders, and tinctures



Capsule of Opium Poppy, showing mode of scoring to cause exudation of juice.

for use—the tincture laudanum, standardized to contain 0.75 per cent. of morphine, being the most common. For smoking, opium requires special preparation. Taken internally the main effect is on the nervous system, the first results being a pleasant stimulation of the mental activities, which is followed by sleep, and is accompanied by an entire dead-

ening of the sensibility towards pain. Opium also slows the pulse and diminishes the activity of the bowels; but its most dangerous effect is its action in stopping respiration, so that a poisonous lose causes death by suffocation. The after-effects of smaller doses of the drug are unpleasant, and stimulate a craving for an additional quantity.

Opium is used therapeutically for the relief of abdominal and general pain, and of insomnia, and in the treatment of diarrhoea and some kinds of cough; but it requires to be used with caution. In opium-poisoning, emetics and strong coffee may be given, and the patient roused in every possible way, artificial respiration

being applied if necessary.

Opium is one of the Optim is one of the main sources of the Indian revenue, and was early introduced into China, although declared illegal by the Chinese government in 1796. This led eventually to the war of 1839. In April 1905, however, the Chinese govern-ment started an opium combine,' which is expected to realize a revenue of twelve millions sterling. See Rowntree's The Imperial Drug Trade (1905).

Opon, tn., Cebu, Philippines; was the scene of the death of Magellan (1521). Pop. 11,506.

Opopanax, an orange-coloured gum-resin of uncertain origin. It is characterized by the considerable proportion that can be extracted by alcohol, and was formerly of value as a drug.

Oporto, city on N. bank of riv. Douro, 2 m. from its mouth, 175 m. N. of Lisbon by rail. This, the second city in Portugal, extends nearly two miles along the river, on an amphitheatre facing the new town of Gaia, similarly situated on the s. of the Douro, with its handsome villas, gardens, and convents. It is the centre of the best cultivated and most prosperous district of Portugal, not only as the centre of the portwine trade, but also as possessing the busiest industrial establishments, especially spinning and weaving cotton, woollen, and silk, distilling, sugar-refining, and tanning. There is an iron bridge of one arch, with the enormous span of 525 feet, and carrying two roadways -one 35 feet over the normal level of the stream, and the other about 200 feet above it. The centre of the city is a fine square, containing a bronze statue of Pedro IV., Emperor of Brazil, and the principal public buildings. There is an ancient Gothic cathedral, modernized in the 18th century. There are several fine public gardens, and an interesting municipal museum with many notable paintings. Pop. (1900) 172,421.

Opossum (Didelphys), a genus of small marsupials whose members are all confined to America. The opossums constitute the family Didelphyidæ, and belong to the carnivorous series of marsupials. They are characteristically arboreal forms, and have long tails, usually partially naked and prehensile. The great toe is capable of being opposed to the other digits, so that the hind foot can be used in climbing. The pouch is usually absent, and the young are carried on the back of the mother, supporting themselves by twisting their tails round hers. Opossums are nocturnal in habit, and feed largely on insects; and in S. America they replace the Eu-



Opossum.

therian insectivores, which are there absent. The largest opossum is the Virginian form, D. the only species marsupialis, which extends into temperate N. America. It is about the size of the cat, and has a long, pointed snout. It is one of the species in which the pouch is complete. This opossum is said to produce as many as sixteen at one time. Other forms are the woolly opossum (D. lanigera) of tropical S. America; the shrew opossum (D. sorex), in which the head and body together measure less than three inches; and a bright red, mouselike form (D. murina), which ranges from Central Mexico to Brazil. Related to the true opossums is the

water opossum, or yapock.

Oppeln, tn., Prussian prov. of
Silesia, on the r. bk. of the Oder, 51 m. by rail s.E. of Breslau. It has a new harbour. Exports leather goods, cement, wood, and cattle. Pop. (1900) 30,112.

Oppenheim, tn., grand-duchy of Hesse, on the Rhine, 18 m. by rails. of Mainz; is a wine-growing centre. Above the town are the ruins of the imperial fortress Landskron, destroyed in 1689 by the French. Pop. (1900) 3,701.

Oppert, Jules (1825-1905), French Orientalist, born in Hamburg. In 1851 he joined the expedition sent by the French government to Mesopotamia. In 1857 he became professor of Sanskrit at the Imperial Library, Paris, and in 1859 was appointed to teach at the Collège de France. He has done important work in Assyriology. Among his publications are Expédition Scientifique en Mésopo-tamie (1859-64), Histoire des Em-pires de Chaldée et d'Assyrie (1866), and Le Peuple et la Langue des Mèdes (1879).

Oppianus, the author of two Greek poems, both composed in hexameters—the one, Halieutica, treating of fishing, and the other. Cynegetica, of hunting. Modern critics have, however, established the fact that these two poems were written by two different authors of the same name -the Halieutica by a native of Anazarba, or Corycus, in Cilicia, who lived about 180 A.D.; and the Cynegetica by a native of Apamea, or Pella, in Syria, whose date is about 205 A.D. The best edition is that of Didot (1846).

Ops, in Latin mythology, the wife of Saturn, her name signifying 'plenty.' She was the goddess of abundance and fertility, corresponding to the Greek Rhea.
Optical Illusion. See ILLU-

SION, MIRAGE.

Optical Projection, method of producing on a screen a magnified illuminated image of a small transparent picture. The picture is usually a photographic positive on a glass 'slide,' which can be slipped into position in the path of a beam of light focussed on The source of light the screen. is in the heart of the lantern, and may be either a lime light or an electric light. The rays are thrown through a powerful lens or system of lenses known as the condenser, and as they converge they are received by a second system of lenses, the relative positions of which may be altered to suit the distance and size of the screen. When the slide is inserted between the condenser and the second system of lenses, an image of the transparent picture on the slide is projected on the screen. The image is sharply focussed by adjustment of the lenses. In a good type of lantern the magnification of the image is within control, depending upon the relative positions of the source of light, the condenser, the slide, and the focussing system of lenses. The use of the tem of lenses. lantern, not only as a means of rational entertainment, but also as an important piece of educa-tional equipment, has greatly grown within the last thirty The ease with which diayears. grams and pictures of all kinds can be reproduced on small slides and then magnified by optical proiection has led to the practical disuse of large diagrams. Especially in the demonstration of microscopic slides in biology, physiology, pathology, etc., has the lantern been of the greatest service. A large audience can now view simultaneously a magnified image of a microscopic preparation where formerly the object could only have been viewed by one at a time through a microscope. For full details for manipulating a projection apparatus, see Wright's Optical Projection (1891).

Optic Nerve. See EYE. Optics, the science which treats of the properties of light, more especially in connection with vision. The rays that enter the eye may have come directly from the object in straight lines through one medium, or they may have reached the eye after various reflections and refractions at surfaces separating different media. Experiment shows that the course of any one ray may be traced with perfect accuracy when the positions and curvatures of the surfaces are known, and also certain physical constants belonging to the media separated by the surfaces. This is the foundation of what is usually distinguished as geometrical optics, in which, from the basis of the laws of reflection and refraction, the properties of pencils of rays can be discussed as a branch of applied geometry. The action of lenses and reflectors, and the theory of the telescope and microscope, may be treated as illustrating this part of the subject, which may be conveniently designated as the theory of the formation of images. For the production of a clear image it is necessary that all image-forming rays which ra-diate originally from a particular point of the object should pass through, or proceed as if they had point in the image. The defect known as spherical aberration, which is inherent in all systems of lenses or mirrors involving spherical surfaces, prevents a per-fect realization of this condition. even with monochromatic light: and when white or any other kind of mixed light is used, another difficulty in refracting systems is encountered—namely, chromatic aberration. (See REFLECTION AND REFRACTION, and SPECTRUM.) By suitable combinations of lenses the undesirable effects of spherical and chromatic aberration may be to a large extent removed. For most practical purposes the ray theory of light is sufficient; but no discussion is completely adequate unless consideration is taken of the phenomena of diffraction. which admit of explanation only in terms of the undulatory theory of light. In this theory the so-called 'ray' becomes simply the direction of propagation of the wave passing through the point considered. See also LIGHT, COLour, Polarization of Light, In-TERFERENCE.

Optimism, as a technical term of philosophy, signifies the conviction or doctrine that good prevails over evil in the structure of the world; or, if we take the point of view of a time process, that good is destined to triumph ever more fully over evil in the course of the world's history. Some such conviction may almost be regarded as a postulate implied in any moral or religious view of the world. Its opposite, pessimism, stands in much the same relation to morality and religion as scepticism does to knowledge. But when the optimist attempts to show in detail how the apparent evil, both natural and moral, that exists in the world, is compatible with the supremacy of a divine providence, he has to encounter grave difficulties. And he is particularly liable to the danger of minimizing, or appearing to minimize, the reality of evil, and may so give occasion for the mockery of a Voltaire. The most famous attempt of the kind is the Théodicée of Leibniz. See also Pessimism.

Options, or FUTURES. See

STOOK EXCHANGE.

Opuntia, a genus of tropical succulent trees and shrubs belonging to the order Cactaceæ. They are natives of America, but several species have become naturalized in the warmer countries of the Old World. They bear yellow or reddish flowers, followed by warty, pear-shaped berries, known as prickly pears. Opuntias are easily cultivated if their soil be well drained and plenty of light afforded. O. Ficus-Indica, the Indian fig, is a native of Mexico, bearing yellow flowers and bristly ovate fruit.

Opus Operatum. See SACRAMENT.

Orach, a name given to the annual plant, Atriplex hortensis, order Chenopodiaceæ. It is a native of Tartary, and is occasionally cultivated in gardens for its leaves, which may be used as a substitute for spinach.

Oracles were in ancient times held to be the means of the revelation of the divine purpose, and thus of future events, to men. They were given to the Jews at the mercy-seat in the tabernacle (Exod. 25:18-22), and King Ahaziah sent to consult the oracle of Beelzebub at Ekron. The Greeks consulted the oracles of Zeus at Olympia and Dodona, and of Zeus Ammon at an oasis in Libya; of Apollo at Delphi, at Delos, and at Didyma near Miletus; of Amphiaraus, near Thebes; and of Trophonius, near Lebadea in Bacotia. The oracle at Delphi was much the most famous and important. Within the temple of Apollo at Delphi there was a

small aperture in the floor, directly above the stream of the Cassotis, from which vapours arose. A tripod was placed above this, and on it the prophetess (called the Pythia) took her seat. She became intoxicated by the vapours which arose from the cleft, and in her frenzy gave utterance which the attendant oracle, which the attendant priest took down and handed to a poet, who reduced it to a regular if somewhat enigmatical expression in hexameter verses. The prophetess was always a native of Delphi; at first a young girl, but latterly only women over fifty years of age. But the real management of the oracle was in the hands of five priests, one from each of five leading families in Delphi. After 400 B.C. it lost influence, at any rate with Athens, by having too eagerly espoused the cause of Sparta in the Peloponnesian war; but it continued to be consulted until about the 3rd century A.D. The oracle which said that Apollo punished, not only the wicked deed, but even the wicked thought, shows the high moral standard which it upheld. Collections of oracles were current in Greece, ascribed to Musæus, Bacis, and other prophets. Of a similar nature were the Roman Sibylline oracles. (See ed. by Sibylline oracies, toee ed. by Ryach, 1890.) For Delphi, see Frazer's Pausanius; for oracles in general, Döhler's Die Orakel (1872), Bouché-Leclerq's Histoire de la Divination dans l'Antiquité (1879 - 81), Henders's Oracula Graca que extant (1877).



Orany-utan.

Oræfa Jökull, the highest mt. in Iceland (6,426 ft.), adjoins Vatna Jökull on the S. Its summit was first reached by F. W. W. Howell in 1891. Volcanic eruptions on the Oræfa are recorded in 1341, 1362, 1598, and 1727.

Orakzais, a Pathan race of Tirsh, N.W. India. In alliance with the neighbouring Afridis, they rose against the British in August 1897, but were subdued by a force under Sir William Lockhart (1897-8),

Oran, fortified scapt., Algeria, on Gulf of Oran, 260 m. by rail w.s.w. of Algiers. The exports w.s.w. or argrers. The exports include esparto grass, iron ore, grain, wool, hides, and wine, most of the trade being with the Spanish coast. Originally built by the Moors, Oran was captured by the Spaniards in 1509, and held by them, with a break of twenty-four years, till 1792. It came into the presession 1792. It came into the possession of France in 1830. Pop. 87,801.

Orang (Simia), an anthropoid ape which is peculiar to the islands of Borneo and Sumatra. There is probably only the one species, S. satyrus, often called the orang-utan, which signifies in Malay the 'man of the woods.' The orang differs much in appearance from its allies the gorilla and chimpanzee. It has enormously long arms, which reach to the ankle when the animal stands upright, and short, thick, twisted legs, with a very feebly developed calf, and narrow flat heels. The hair is very long, and is reddish in colour. The skull is without the prominent super-ciliary ridges of the gorilla, and is produced at the vertex, so as to give the animal the appearance of possessing a much elevated forehead. The central bone of the carpus, absent in man, the chimpanzee, and the gorilla, is here present; the great toe is very small, is devoid of a nail in the adult, and is often also without its terminal phalanx; there are only sixteen dorso-lumbar vertebræ in place of the seventeen found in man, the gorilla, and the chimpanzee-all points which show that the orang is lower in organization than the two latter. The orang is a denizen of thick forests, and in its whole organization is adapted for the arboreal life. It subsists chiefly on fruit, especially the durian or jack-fruit, but also eats leaves, buds, and young shoots. The animals live in small family parties like the gorilla, and construct shelters in the trees, at a height of from twenty to fifty feet above the ground. They are singularly deliberate in their movements, swinging themselves along by their powerful arms, but never attempting to leap or jump from one branch to another. The adult male reaches a height of about 4 ft. 4 in., and his canine teeth are of great size, giving the animal an appearance of much ferocity. Another peculiarity which ren-ders the adults very unprepossess-ing in appearance is the presence of a huge collar formed of folds of skin in the neck region. This in old males may assume enormous dimensions. The nose is broad and flattened, the upper lip long and broad.

Orangs will not live in captivity

in Britain, but they have been kept as pets in their native country, as well as in India. See ANTHRO-

POID APES.

Orange. (1.) Roman Arausio, tn., dep. Vaucluse, France, 13 m. N. of Avignon. It contains numerous and beautiful Roman remains. Pop. (1901) 9,700. town was the capital of the tiny principality of Orange (in-dependent from the 11th to the 16th century). The fief passed by marriage into the hands of the house of Nassau in 1531, and the first Nassau Prince of Orange was the father of William the Silent. The principality was annexed by France in 1713. (2.) Town on Buckman's Swamp Creek, N.S.W., 192 m. by rail w. of Sydney. Its bracing climate makes it a sanatorium for consumptives. a sanatorium for consumptives. There are copper and silver mines, breweries, and tanneries. Pop. (1901) 6,330. (3.) City of Essex co., New Jersey, U.S.A., 5 m. from Newark. Manufactures fur hats. Pop. (1900) 24,141. (4.) Town, Franklin co., Mass., U.S.A., 86 m. n.w. of Boston; manufactures sewing and other machinery. Pop. (1900) 5.520.

Orange, the fruit of Citrus aurantium, the two main types of which are the sweet and the bitter or Seville orange. orange tree is a native of Asia, the sweet variety, at any rate, being a native of China. It was introduced into Europe by the Portuguese in 1547. Probably the most delicious are the mandarin of China, which is broader than long in shape, and the navel of S. America; but of those more usually to be purchased in Britain the St. Michael is considered the finest. This variety is pale in colour, thin-skinned, juicy, flattish in form, and practically seedless. Among other varieties of sweet orange may be named the Jaffa; the Majorca, a seedless kind; the Maltese blood, which is large and oval, with a dark-red pulp—an exceedingly rich variety, good and distinct; Tangierine, a variety of the man-darin; the little Chinese and Japanese kum-quat; the egg, a large-fruiting kind, so called from its shape; and the round, thick-skinned Portugal or Lisbon, which is that most often seen in English shops. Orange trees reach a great age, often a hundred and fifty years or more; and a tree in full bearing often yields from ten to twelve thousand fruits in a year. The leaves of the orange tree are glossy and evergreen, and the tree bears beautiful, fragrant white flowers, from which oil of neroli is obtained. All imported oranges are gathered in an unripe condition, and therefore never acquire the fine flavour of fruit gathered at the proper

season. The value of the oranges imported into Great Britain in 1905 exceeded £1,949,496.

As decorative plants, trees may be grown in tubs or borders in the cool-house; but if good fruit is desired, heat is required. One of the most prolific of dessert oranges adapted to hothouse cultivation is the Tangierine, the tree having small leaves, and seldom attaining a height of more than seven feet, even in N. Africa.

Orangeism. From the days of the Plantation a feud of race and faith raged in Ulster between the Presbyterian and the Catholic peasantry. The events of the French revolution, the treachery experienced by the Protestants at the Battle of the Diamond' (1795), and the revival of extreme Protestant ascendency, in 1794-5, gave a fresh impetus

to this savage strife.

After the battle of the Boyne the oppressed Irish Catholics began to form semi-revolutionary societies, and in opposition the Protestants formed the society known as the Loyal Orange Institution. The professed objects of the latter are to support and defend the Protestant succession to the British throne and the Protestant religion in Church and State, as settled by the Bill of Rights and Act of Settlement of 1688. Though the name is derived from the Protestant William III. (of Orange), who drove out the Catholic James II., Orangeism was not definitely established in Ulster till 1795. It then extended rapidly, and had lodges also in England and abroad. Parliament had to check the turbulence of the organization on more than one occasion, and from 1813 to 1828 it was suspended in Ireland. Orangeism is essentially political. and the irritation produced by publicly keeping anniversaries painful to their Catholic neighbours has done much to keep alive and inflame sectarian animosities, leading not infrequently to riotous encounters.

Orange River, GARIEP, GROOTE RIVER, the longest river of S. Africa, but practically useless for navigation, because of the bar at its mouth and rapids some 20 m. further up. It rises in the Drakenberg, and flows almost 1,300 m. in a general westerly direction across the continent to the Atlantic. Its drainage area is between 300,000 and 400,000 sq. m. It divides Basutoland and Natal, and Basu-toland and Cape Colony. Then it forms the s. boundary of the Orange River Colony, receiving the Caledon (Mogokare), over 200 m. long, on the r. bk. A little w. of 24° E. it is joined on the r. bk. by the Vaal. Before reach608

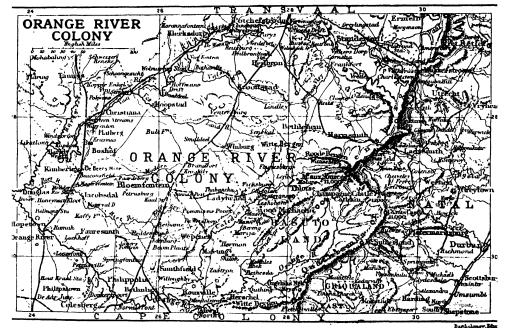
ing 20° E. it descends the Falls of Aughrabies (Great Falls), 400 ft., by a magnificent series of falls and rapids. Beyond 20° the Orange forms the boundary between Cape Colony and German S.W. Africa.

Orange River Colony, British colony, S. Africa, bounded on the s. by the Orange R. On the E. the Drakenberg and the hills of Basutoland form a very distinctive line. The area is estimated at over 50,000 sq. m., and the population in 1905 was 142,679 whites and 244,636 natives. Bloemfontein is the capital. The mean clevation is about 5,000 ft., which makes the climate in general dry and healthful.

June 30, 1905, were valued at £2,263,925; the imports (clothing, cotton goods, blankets, timber, hardware, food and drink stuffs) at £3,251,098. Roman-Dutch law prevails. The chief religious body is the Dutch Reformed Church; English Episcopalians, Wesleyans, Roman Catholics, Lutherans, and Jews are also represented. Education is not compulsory, but was made free in the elementary schools in January 1904.

History.—In 1836 when the great trek of Boers from Cape Colony took place, a large number of the Boers moved to the country north of the Orange R., while others went north of the Vaal R. The country be-

Oratorio, a musical drama of a sacred or semi-sacred nature, requiring for its adequate performance a large body of singers, with a full orchestral accompaniment, which is also frequently supplemented by a part for the organ. The term oratorio came into existence during the latter part of the 16th century, and was first applied to musical settings of scenes from sacred history, performances of which were instituted by St. Philip Neri. The first sacred play set entirely to music was composed by Emilio del Cavaliere, and produced in Rome in 1600; but the earliest composer of oratoriomost nearly approaching the pres-



The settler has to trust to artificial dams for a water-supply; but much of the land is very fertile, the best agricultural districts lying along the slopes of the Wittenbergen hills. Coal is abundant in the N. Kroonstadt being the centre; diamonds are mined in the Fauersmith district, chiefly at Jagers fontein and Koffyfontein, and also at Kroonstadt; gold is also found.

The colony is administered by a lieutenant-governor and executive and legislative councils under the governor of the Transvaal and Orange River colonies, but self-governing powers are about to be conferred upon it. The exports (chiefly wool, diamonds, hides, and grain) for the year ending

tween these rivers was formed into a republic in 1842, but was proclaimed British territory in 1848. In 1854 the country was returned to the Boers, who then proclaimed an independent republic under the name of the Orange Free State. In the Boer war of 1899-1992 the Orange Free State threw in its lot with the Transvaal. Bloemfontein was occupied by Lord Roberts on March 13, 1900, and the state was annexed to the British crown on May 28, 1900, and was called Orange River Colony. See S. African War.

Oranienbaum (Rambov), tn., St. Petersburg gov., Russia, 16 m. w. of St. Petersburg, on Gulf of Finland, facing Cronstadt; summer resort. Pop. (1897) 5,333. ent form was Carissimi (1604-74), some of whose works are still performed. In Germany, oratorios in the form of Passion music date from an early part of the 17th century, but the style retained many of the characteristics of the old polyphonic school of composition, while Italian oratorio, like opera, was founded upon the monodic system of harmony. During the 18th century, the most prolific and in some respects the greatest of all composers of oratorio was Handel, who settled in England early in life. His most famous oratorio, the Messiah (1741), was written in twenty-four days. The oratorios which perhars most seriously rival those of Handel

as regards frequency of performare and degree of popularity are Haydn's *Creation* (1798) and Seasons (1801), and Mendelssohn's St. Paul (1836) and Elijah (1846). The term oratorio is also applied to almost any choral-orchestral worle in which the music is in the style of an oratorio, and the subject treated is of a serious nature. Certain forms are designated secular oratorios—e.y. Haydn's Seasons and Bruch's Odysseus. The modern requiem mass may be regarded as a form of oratorio. In all choral-orchestral compositions instrumental music is now an important feature, and in the productions of certain composers the orchestration is almost symphonic in treatment. Amongst well-known works more or less in the nature of oratorios, and which have been produced during the 19th century, may be mentioned Beethoven's Mount of Olives, Spohr's Last Judgment, Bennett's Woman of Samaria, Macfarren's St. John the Baptist, Benedict's St. Peter, Sullivan's The Prodigal Son, Costa's Eli, Brahms's German Requiem, Song of Destiny, and Triumphlied, Gound's The Re-demption and Mors et Vita, Massenet's Marie Magdeleine, Verdi's Requiem, Saint-Saëns's Samson et Dalila, Franck's The Beatitudes, Elgar's Dream of Gerontius and The Apostles. In no other country are the composition and performance of oratorio more assiduously cultivated than in Great Britain.

Oratory, the art of speaking with elevated thought, sentiment, and corresponding expression so as to appeal persuasively to an audience. The art was highly cultivated among the Greeks and Romans—the greatest among the former being Demosthenes, and among the latter Cicero. The harangues of Peter the Hermit, the eccentricities of mediæval preaching, the earnestness of reformation preachers, and the stormy speeches of the French revolution are but different forms of the art, which, in some of its greatest phases, was exemplified in the parliamentary eloquence of, among others, Pitt, Burke, Fox, Henry Clay, Webster, Wendell Phillips, Bright, and Gladstone. See ELOCUTION.

Oratory, CONGREGATION OF THE, arose in the 16th century. Philip Neri, a native of Florence, founded a small society at Rome in 1548, called the Confraternity of the Holy Trinity. He also held conferences for the deepening of the spiritual life, in which Baronius was associated with him. They met in a hall in the form of an oratory, and out of these conferences arose the society of the Priests of the Oratory. In 1574 a larger

hall was built under the patronage of Pope Gregory XIII., who formally constituted St. Philip as the first general of the new society. Soon the movement extended to Milan, Naples, Palermo, and elsewhere. There is also a Congregation of the Oratory in France, which was founded by Cardinal Bérulle in 1611. After his death in 1629, the order extended considerably. Branches were established in England in 1848. To one of these John H. Newman attached himself, at Birmingham. The priests of the Oratory are not bound by special vows, but devote themselves to the more spiritual work of the church. The Rev. F. Faber and others established themselves first in King William Street, Strand, in 1848, and afterwards at Brompton.

Orbigny, ALCIDE DESSALINES D' (1802-57), French naturalist, undertook a scientific mission to S. America (1826-34), the results of which appeared in his Voyage dans PAmérique Méridionale (1834-47), which included an ethnological study of American races. His chief work was, however, his unfinished Paléontologie Française (14 vols. 1840-54), still authoritative. He also published a Galerie Ornithologique des Oiscaux d'Europe (1836-38), Mollusques Vivants et Fossiles (1845), and Prodrome de Paléontologic Stratigraphique Universelle (1850).

Orbilius, Pupillus, a Roman grammarian and schoolmaster, famous as the teacher of the poet Horace, who named him Plagosus, fond of thrashing. He was a native of Beneventum, and settled at Rome (63 B.C.) when he was about fifty. See Horace's Satires.

Orbit, the path pursued by one heavenly body about another under the influence of its attraction. The orbits traced by the planets and satellites of the solar system are ellipses, one focus of which is occupied by the governing mass. A planetary orbit is determined by the assignment of numerical values to the following seven elements-the semi-major axis, eccentricity, inclination to the ccliptic, longitude of the ascending node, longitude of peri-helion, period, and epoch. The orbits of comets are usually very eccentric ellipses scarcely distinguishable from parabolas. Hyperbolic tracks are uncommon, and probably result from perturbation. The elliptical orbits of binary stars are, on an average, twelve times more eccentric than those of the planets. Spectroscopic binaries travel along paths more nearly circular than those visually pursued. The periodical variations of their radial velocities supply data for computing their orbital elements.

Orcagna and ARCAGNOLO, the common designations of ANDREA DI CIONE (c. 1316-c. 1376), Florentine painter and sculptor, who for some time after the death of Giotto was the leading artist in Florence. In painting, his chief works are frescoes in the chapel of Santa Maria Novella, Florence. His St. Zenobius Enthroned is also at Florence, and an altarpiece of the Crowning of the Virgin is now in the National Gallery, London. His painting combines in a remarkable degree strength and delicacy, with singular purity of colour. The chapel of Or San Michele, Florence, of which he was architect, contains an exquisite marble tabernacle from his hand.

Orchard, a plantation of cultivated fruit trees. The soil should be deep and well drained, or if shallow it should be loosened as deeply as possible, trenchploughed, and well blended with manure by repeated harrowings. The best situation is a gentle slope towards the south; the worst aspect is a north-easterly Where necessary, shelter one. from strong winds should be given by means of a belt of trees. The fruit trees are best planted in straight lines, pyramid pears or apples (when the trees are thinned to six feet apart in a few years) 4,840 trees per acres are required, the distance apart being three feet; 2,722 plants per acre at four feet apart are required for gooseberries and currants on poor soil; 1,742 at five feet apart for the same on better land; 1,210 at six feet apart for these or for pyramids which are to be permanent; 302 at twelve feet apart for bush trees, pyramids, and nuts; 193 at fifteen feet apart for standard plums, damsons, or Kentish red cherries; 134 at eighteen feet apart for the same; 108 at twenty feet apart for apples, pears, etc., as standards; 90 at twenty-two feet apart for the same; 75 at twenty-four feet apart for the same, or for the moderate growing cherries; 48 at thirty feet apart for cherries where pastured underneath. Strawberries for market require, at 1 ft., 43,000 per acre; 1½ ft., 19,350; 2 ft., 11,000. In the foot planting, the alternate plants are ploughed up in the second and third years, leaving the plantation two feet apart each If cherries are selected, way. the intermediate space may be filled with some of the early fruiting apples and pears as well as plums and damsons, which must be removed when the cherries require all the room. Cherries are best grown on grass land. Attention should be paid to the very different rate at which trees progress, or some parts of the or-chard will become crowded, while others will be too thin. entire apple or pear orchard is required, the rows should be alternated. The largest apple orchard in the world is said to be situated near Lebanon, in Missouri. It consists of 2,300 acres, planted entirely with apples, and is reported to excel in quality as well as in size. Healthy established orchard trees will yield large crops occasionally, but can only be sold at low prices, generally averaging £9 per ton, or £18 to the acre. The average yield of hardy, well-cultivated, and carefully-selected fruit per acre will be worth from £30 to £40, which is increased in well-managed mixed plantations containing apples and plums. The average annual expenses are from £10 to £20 an acre, exclusive of the capital sunk in the first preparation of the land and in planting, which may range from £50 to £100 per acre. See Bun-yard's Fruit Farming for Profit, Thomas's American Fruit Culturist, and the Royal Horticultural Society's Prize Essays on Hardy Fruit Growing; also FRUIT, GAR-DENING, PLANTING, and PRUNING.

Orchard-house is a glass house, either cool or heated, devoted to the culture of fruit trees in pots or borders. This method is mainly due to Mr. Thomas Rivers. The drainage of the pots is most important. A large arched piece of crock having been placed over the central hole in the bottom of the pot, a layer of smaller pieces should be placed over that, and on this should be placed a layer of chopped turf, the actual soil used being a mixture of two-thirds fibrous loam and one-third of thoroughly rotten manure, with a few crushed bones and a very little lime or old plaster.

The trees generally require repotting annually—a work which should be performed after the fruit is gathered, but before the leaves have fallen. As a rule, however, little is required beyond the replacement of a little of the old soil by new and the addition of some bone-dust or artificial manure. Watering must be attended to with regularity. Ventilation is important, both in winter and summer. In the early spring a night temperature of from 36° to 40° is sufficient.

Orchardson, WILLIAM QUILLER (1835), Scottish genre and portrait painter, born in Edinburgh. In 1863 he went to London, and the following year began to exhibit at the Royal Academy, of which he was elected an associate in 1868, and an academician in 1877,

in which year his Queen of the Swords attracted much attention at the Paris Salon. Napoleon on the Bellerophon (Tate Gallery), 1880, established his reputation. His reticent, self-contained work, accurate in expression, dextrous in execution, painted usually in a flaxen, delicate tone of colour,' owes its popularity to a broad dramatic effectiveness, to a skilful interpretation of psychological moments. As a colourist he is one of the most distinctive of British painters. The Tate Gallery possesses also Her First Dance, The First Cloud (replica of a picture in Melbourne), Her Mother's Voice; and there are two excellent paintings in the Glazgow Municipal Gallery. See Armstrong's The Art of W. Q. Orchardson (1895).

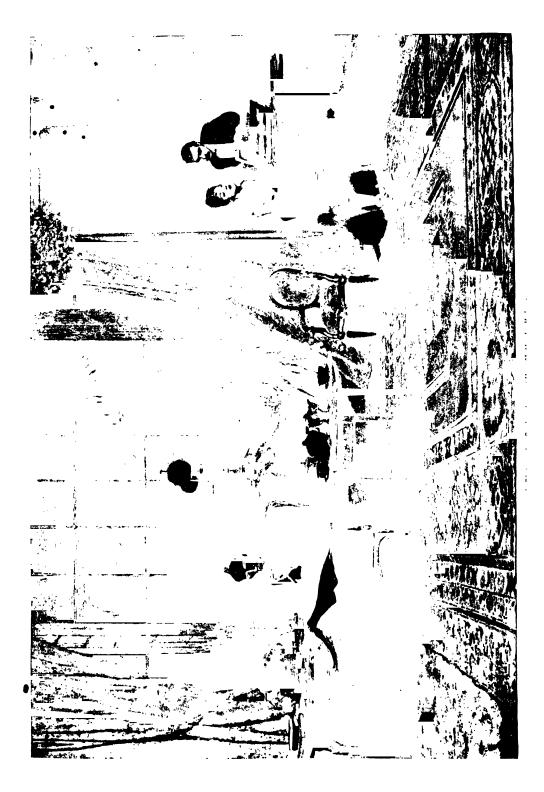
Orchestra. A body of per-formers on any kind of musical instrument may be termed a band, but the title orchestra implies that stringed instruments played with the bow constitute an essential feature of the com-bination. The use of orchestral accompaniment to dramatic music was introduced in Italy and France about the beginning of the 17th century, during which period Monteverde of Mantua is believed to have done most to further its development. In his opera, Orfeo (1608), he employed an orchestra of thirty-six instruments, consisting of harpsichords, violins, viols, lutes, guitars, organs of wood, trumpets, flutes, and other instruments. Orchestral music gradually developed into a separate branch of art, which has become perhaps the greatest of all forms of musical com-positions. At a comparatively early period the violin became the leading instrument—a posi-tion it has since maintained—and subsequently all instruments of the viol class were unsured favour of the violin, viola, violation of the violin, viola, This loncello, and double-bass. family of instruments constitutes what is termed the full-stringed band. The different kinds of instruments used in the modern orchestra and their numerical proportions to one another are regulated to some extent by the size of the combination and the nature of the works performed. An example of a well-arranged orchestra contains fourteen first violins, twelve second violins, ten violas, eight violoncellos, eight double-basses, one harp, three flutes, one piccolo, three oboes, one cor anglais, three clarinets, one bass clarinet, three bassoons, one contra fagotto, four horns, four trumpets and cornets, three trombones, one bass tuba, three kettledrums (tympani), one side drum, one bass drum, one triangle, and one pair of cymbals.

The manner in which the tones of the different instruments are blended or contrasted in an orchestral composition is termed orchestration or instrumenta-tion. Orchestral music, apart from its use in conjunction with works of a dramatic nature (see OPERA and ORATORIO), did not receive serious attention until about the beginning of the 18th century. Amongst the names of those most intimately associated with its development are Bach, Gluck, Haydn, Mozart, Bee-Schubert, Schumann, thoven, Mendelssohn, Berlioz, Wagner, Brahms, Tschaikowsky, Dvorák, and Richard Strauss. See Music; articles on the individual musical instruments; and Berlioz's Traité d'Instrumentation (1844; Eng. trans. 1856).

Orchha, or URCHHA, feudatory state in Bundelkhand, Central India. Tehri is the capital. Orchha, the former capital, situated on the river Betwá, has an imposing fort.

Orchids, perennial herbaceous plants, with fleshy or leathery parallel-veined leaves, and remarkable flowers of every size and colour, with three sepals, and three petals, of which the lower one is usually larger, wider, and more brightly coloured than the others, and is known as the labellum. The pollen is often raised in masses, or pollinia, on little stalks. In Great Britain there are some ten species of orchids belonging to the genera Orchis. Several of these are common throughout the country in heaths and marshy ground. Orchid is also the popular name given to several species belonging to the allied genera Habenaria and Ophrys.

The cultivation of orchids is practically confined to those of foreign origin, and requires on the part of the grower care, study, and knowledge of the con-ditions under which the species naturally grow. Mr. White has summed up the conditions which must be observed in cultivating five great typical groups of imported plants—Aerides, Cypripediums, Cattleyas, Dendrobi-ums, and Odontoglossums. The first division may be taken to include also Sacrolabiums, Vandas, Aeranthus, Renantheras, Phalænopsis, etc., none of which possess pseudo-bulbs, and consequently. pseudo-pulps, and consequency, as a general rule, arrive in a very dry, shrivelled condition. These plants should be placed in as small pots as possible (teak woods) baskets are preferable for Phalsenopsis), using the crocks for potting, so as to come up almost to the edge of the pot, covering the whole with good living sphagnum moss, and pressing it down moderately firm. After potting, place



the plants in a warmer atmosphere, in what is generally termed the East Indian house. They require but little water until thoroughly established, just enough being afforded to keep the sphag-nameresh and green. The retention of the leaves being necessary to the well-doing of the plants, they should be carefully shaded. Newly-imported plants of the dif-ferent genera above mentioned frequently send out flower-spikes, which should always be pinched off, as nothing tends so much to debilitate the plants as early flowering. Cypripediums should, as a rule, be placed in very small pots, keeping the base of the foliage on a level with the rim of the pot, filling up with rough crocks only, and affording plenty of water through the crocks. When root action begins, remove a few of the crocks, and pot firmly with a mixture of peat and sphagnum moss. Imported Cattleyas should be placed in pots just large enough to allow room for one season's growth, the pots being nearly filled with drainage materials, making each plant quite firm by tying the pseudo-bulbs to neat sticks, so as to steady them. This is very important, because if the plants are allowed to sway about every time they are moved, they will never become properly rooted. The crocks in which the plants are placed should be watered very sparingly at first. The intermediate house is the proper place for them, the moisture of the atmosphere at once checking evaporation, so that reaction quickly commences. The back pseudo-bulbs send forth sufficient sap to enable the leading growths to distend and to make a new break, from which sooner or later roots emerge. As soon as the young growths and roots are fairly started, the plants may be potted in the ordinary manner. Newlyimported Dendrobiums are easy to manage: as soon as roots show, the plants may be potted. The dwarf and pendulous varieties succeed best if placed in small shallow hanging pans, with perforations round their sides, through which the air circulates. Overpotting must be carefully guarded against; for if the roots get into a mass of sodden compost, they speedily decay, and the young growths are prematurely stopped.

The Odontoglossums are the most popular family among the cool-house orchids, especially Odontoglossum crispum (Alex-Andre) and its very numerous and beautiful varieties. If the plants are imported during warm weather, they may be slightly damped; but this is not necessary in late autumn or early spring. When the new growths and roots appear, put the plants

into pots. Pot each piece separately, for scarcely two varieties can be found exactly alike, and select pots as small as can conveniently be used. It is not necessary to use broken crocks for drainage, a more suitable substitute being the bracken rhizomes found in the peat, which may be

ting, keep the atmosphere cool and fairly moist, shade from direct sunshine, and afford but light waterings until each plant has become firmly rooted. After the first growth is formed and new growth has recommenced, the plants should at once be transferred to larger pots.



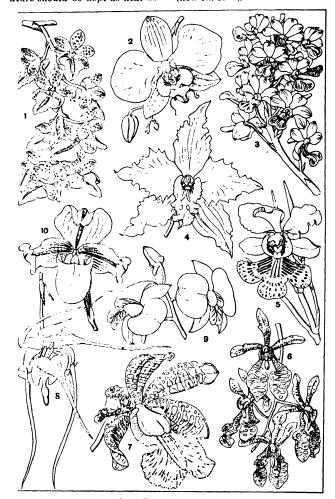
British Orchids.

Habenaria bifolia.
 Listera ovata.
 Orchis maculata.
 Spiranthes autumnalis.
 Cepalanthera grandifiera.
 Acera anthropophora.
 Epipactis latifolia.
 Cypripedium calceolus.
 Ophrys apifera.
 Cheotta nidus-avis.

broken in pieces or twisted around the bottom of the pot to about an inch in depth. A good general compost for potting Odontoglossums consists of equal parts of good fibrous peat and freshlygathered sphagnum moss, with the addition of a moderate quantity of broken crocks. After potThe temperatures which should be aimed at in the various orchid houses are as follows:—East Indian House: During the summer, from 65° to 70° by night, and from 70° to 80° by day, rising from 10° to 15° during sunshine; winter, from 60° to 65° by night, and from 60° to 70° by day. Cattleya House:

During summer, from 60° to 65° by night, and from 65° to 70° by day, rising higher with sun heat; winter, from 55' to 60' by night, and from 60' to 65° by day. Intermediate House: The temperature should be between that of the Cattleya and that of the cool house. Cool House: The temperature should be kept as near 60°

Darwin's On the Various Contrivances by which British and Foreign Orchids are Fertilized by Insects (1862; new ed. 1904); Sander's Orchid Guide (new ed. 1902); White's Book of Orchids (1902); Boyle's Greenhouse Orchids; and Watson's Orchids: their Culture and Management (new ed. 1903).



Some Foreign Orchids.

Actides Lobbii.
 Phalenopsis anabilis.
 Saccolabium celeste.
 Odontoglossum Alexandræ.
 Vanda Hookeriana.
 Renanthera Storiei.
 Cattleya Aclandiæ.
 Dendrob m begebbum.
 Acranthus grandiffora.
 Cypripedium Druryi.

as possible by day and 55° by night during summer. In winter the night temperature may fall to from 45° to 50° without injury to the plants, but should be increased several degrees by day. Nearly all species of orchids require a moist atmosphere during the growing season. See

Orchil. See Archil. Orchomenus, city in Bœotia in ancient Greece, on the Cephissus, N.W. of lake Copais. in 364 B.C., but was restored by Philip of Macedon in 338 B.C.

Orcin, or ORCINOL, is 1.3.5 dihydroxy-toluene, C6H3CH3(OH)2. occurring in lichens of the species Roccella and Lecanora. It can be prepared synthetically, and forms sweetish crystals (m.p. 58° c., b.p. 288° c.) which dissolve in water and give a blue-violet coloration with ferric chler. ... On exposing its solution in ammonia to the air, it forms orcein, the red dye present in archil. .

Orcus, in Latin mythology, one of the names of the god of the lower world, identified with the Greek Hades or Pluto.

Ordeal, a term applied to certain archaic methods of obtaining, as was believed, the Divine judg-ment in doubtful cases by means of various physical tests. In the ordeal of bier-right, exemplified in Scott's Fair Maid of Perth, the belief acted upon was that the corpse of a murdered man would bleed at the touch of his murderer.

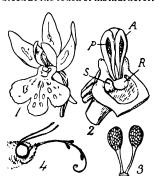


Diagram of the Fertilization of an Orchid.

1. Single flower of Orchis maculata. 2. Column: A. anther cell; P. pollen mass; R. rostellum; S. stigma. 3. Pollen masses, detached. 4. Head of moth, with pollen masses adhering to the proboscis.

All those suspected of the deed were therefore led to the bier and made to touch the body. If blood flowed, the person thereby adjudged to be guilty was executed. In a Scottish murder cuted. In a Scottish murder trial of as recent a date as 1688, the circumstance that the corpse had actually bled when incidentally handled by the suspected murderer was included in the evidence against him. In the ordeal by fire, which was con-ducted in churches, under priestly superintendence, the accused had to carry a red-hot bar of iron nine yards from the fire, or to put on a pair of red-hot steel gloves, or to walk, barefoot and blindfold, along a path strewn with red-hot ploughshares. A kindred, tes was the plunging of the hand into boiling water. Innocence or guilt was otherwise decided by wager of battle, a champion being selected to meet the accused, who, if defeated, was of course guilty. Or, in some cases, he was offered

a poisoned drink, the chances of surviving which were very slight. Ordeal by swimming was commonly practised in dealing with women accused of witchcraft. Suspected witches were tied hand a before and thrown into a lake or stream. If they floated, they were proved witches, and they were accordingly taken out and executed. If they sank, and were (incidentally) drowned, they were innocent. There can be little doubt that trial by ordeal was often merely a vehicle for getting rid of obnoxious persons, under cover of legal procedure.

Order, in natural science, a grade in classification inferior to class and sub-class, and embracing a group of related families. But in zoology class and order sometimes have the same range. In botany it is customary to employ the term 'natural order,' the adjective being a heritage from the days when the classification of the flowering plants was based on pro-

fessedly artificial distinctions.
Ordericus Vitalis (10751143), monk and historian, of
Norman parentage, entered the
Benedictine monastery of St.
Evroul in Normandy in 1085.
Here he wrote the Historia Ecclesiastica. The last portion, which
deals with the writer's own time,
is of singular value. See preface
by Guizot to the English translation in Bohn's Antiquarian
Library (1858-60); also critical
account by Delisle in vol. v. of
Le Prévost's edition (1838-55).

Order in Council. An Order in Council is an order made by the King in Council, generally on the instigation of the executive officers of the crown. recent years it has been the increasing practice in numerous Acts of Parliament to authorize the permanent departments by Order in Council to make rules under the acts, so that the details of legislative action are entrusted to permanent officials, and not elaborated, as of old, by Parlia-ment. Orders in Council are also issued authorizing treaties, regulating colonial government, and determining appeals heard in the Privy Council by its judicial com-mittee. (See PRIVY COUNCIL.) Historically, Orders in Council were the weapons employed by the British government in their commercial warfare with Napoleon. See CONTINENTAL SYSTEM.
Orderly. Private soldiers are

orderly. Private soldiers are employed as orderlies to certain officers, or for duties connected with regimental, staff, or departmental offices, where they serve as messengers and keep the premises clean. A general officer usually has non-commissioned officers as well as privates detailed to attend on him in a military capacity. Orderlies may be 'standing order-

lies,' who, once detailed, carry out their duties day by day until further orders, or they may be regularly detailed every day or week for duty for the next day or week. Every squadron, battery, and company has an orderly-sergeant and an orderly-sergeant and an orderly-sergeant and every barrack room an orderly-man, for certain duties of interior economy, and these are changed weekly. Orderly-officer is the term applied to the subaltern of the day in cavalry regiments and infantry battalions, and this name is also given to an officer temporarily selected to act as aide-de-camp to a general officer without being gazetted as such. An orderly receives no extra pay or allowances for this work. Hospital orderlies are supplied by the Royal Army Medical Corps.

Orders, ARMY. These are issued monthly by the Army Council, and contain new regulations, changes in existing ones, and such other announcements as it may be desirable to publish broadcast throughout the army. Every officer is expected to be acquainted with these orders. Garrison orders are issued daily from the headquarters office in each command, and in addition every officer commanding a unit issues his regimental orders daily.

Orders, Holy. In the Church of England there are three degrees of holy orders-bishops, priests, and deacons. Ordination is by laying on of hands by a bishop, but it is not a sacrament as it is in the Church of Rome. A candidate for ordination must have a title-i.e. some preferment to provide for his maintenance. A deacon must be twenty-three, unless he obtains a dispensation, and a priest must be twenty-four. Holy orders are indelible, al-though a clergyman may be de-posed or degraded, and thereby loses all the advantages and privileges of the clerical estate; and by the Clerical Disabilities Act. 1870, a priest or deacon who has resigned every preferment held by him may execute and enrol a deed relinquishing all rights and privileges belonging to the office, and he will then be discharged and freed from all disabilities, disqualifications, restraints, and prohibitions to which, but for the act, he would have been liable. The Church of Rome recognizes also the inferior orders of sub-deacon, acolytes, and exorcists. Church of England recognizes the orders of the Church of Rome and of the Greek Church as valid, but the Church of Rome does not recognize the validity of Anglican orders.

Orders of Knighthood. Knight is derived from the Anglo-Saxon cniht, 'a youth'—a term which early became restricted to the attendants of an earl or prince, and, later, limited to a special military class distinguished by descent or special valour, which held lands by tenure of its knighthood. Fitting candidates were admitted to the rank originally by a sword being girded on to the new knight by the superior, or by the latter giving him the accolade by striking him lightly with a sword on the shoulder and dubbing him knight; but later the initiation became surrounded with many religious ceremonies. These religious rites in connection with the ceremony, between the time of Charlemagne and the crusades, caused the idea of knighthood as a semi-ecclesiastical as well as a military institution to spring into existence; and orders of knights were and orders of knights were founded, their formation being to some extent modelled upon that of the religious orders. first chivalrous orders were military, and were instituted in order that certain picked knights, living under a religious rule, wearing a special dress, and obedient to a grand master, should be available to assist Christian pilgrims, to defend or recover the holy cities from the Saracen, and to lead crusades against the Moslems in Spain or the heathen (Slavs) in Eastern Europe. Of these the chief orders (which were very powerful) were the Knights of St. John, Hospitallers, the Templars, the military orders of Spain and Portugal (Alcantara, Calatrava, Order of Christ, etc.), and the Teutonic Knights, all of which were founded during the 12th century.

After chivalry as an institution fell with new modes of warfare, which followed the introduction of gunpowder, orders of knighthood still continued to be instituted, but their purpose was changed. They were now founded (most orders were said to be vived' from an earlier and often mythical order) or continued as a special distinction, so that sovereigns might admit their most trusty courtiers into a chosen body, wearing a ceremonial dress and special insignia, as a mark of favour or reward of merit. The few military orders that still exist are now, in almost all cases, in the same category as those founded later, the sovereign having become their grand master. There is hardly any old kingdom that boasts no order of knighthood, but the United States of America has none. In Asia there are some orders: Persia has the Sun and Lion (1808); Siam, the White Elephant (1861); China, the Double Dragon (1862; remodelled 1882); and Japan, the Eastern Sun (1875) and the Chrysanthemum (1876).

In Britain alone simple knight-

Orders of Knighthood

hood still exists, and one knighted by the sovereign without being attached to any specific order is styled Knight Bachelor; he, like all other British knights, receives the title of 'Sir' as a prefix to his Christian name, and his wife is styled 'Dame' or 'Lady.' The orders of knighthood in Great Britain are:—(1.) The Order of The Order of the Star of India, founded by Queen Victoria in 1861, for subjects who have distinguished themselves in India. (6.) The Order of St. Michael and St. George, founded in 1818, originally for natives of the Ionian is, and Malta; the scope was changed in later times, to decorate those who distinguished them-

614

SPAIN. AUSTRIA COLDEN COLDEN FLEECE. ANNUNZIATA. FLEECE. DENMARK SWEDEN LECION HONOUR. ELEPHANT. SERAPHIM. PRUSSIA. TURKEY STAR ST ANDREW. BLÁCK MEDJIDIE. BADGE EAGLE.

Insignia of Foreign Orders of Knighthood.

the Garter, founded by Edward III. of England between 1344 and 1351. (2.) The Order of the Thistle, founded by James VII. of Scotland in 1687, and revived by Queen Anne in 1703. (3.) The Queen Anne in 1703. (3.) The Order of St. Patrick, founded, for Ireland, by George 111. in 1783 (revised 1905). (4.) The Order of the Bath, founded by George I. in 1725, and enlarged in 1815. (5.)

selves in the colonial service. (7.) The Order of the Crown of India, founded for ladies in 1878. (8.) The Order of the Indian Empire, instituted 1878-86. (9.) The Order of Victoria and Albert, founded for ladies between 1862-4. (10.) The Royal Victorian Order, founded in 1896. In addition there are several military orders not conferring knighthood, though con-

stituting a chivalrous order—for instance, the Distinguished Service Order (1886); and there are civil orders of a similar kind also, such as the Imperial Service Order (1902) and the distinguished Order of Merit (1902). A military decoration but not an order is the valued Victoria Cross (1856), whereas the Order of St. John of Jerusalem exists for charitable work, but gives no title or rank.

The older and most important European orders are as follows:-Austria and Spain: the Golden Austria and Spain: the Golden Fleece, a highly-esteemed order, founded by Philip the Good, Duke of Burgundy (1429). Austria also, inter alia, has St. Stephen, instituted by Maria-Theresa for Hungary (1764), Elizabeth - Theresa (1750), Maria-Theresa (1757), and many other noble orders, down to many other noble orders, down to Francis Joseph, founded in 1849. Spain, besides the Golden Fleece, has the Order of Calatrava (1158), St. James of Compostella (1175), Alcantara (1174), Our Lady of Montesa (1319), military orders of which the king is now grand master, and many more modern.
Portugal has the Order of St.
Benedict of Aviz (1158), St. James of the Sword (1175), Order of Christ. and many others. Ba-Christ, and many others. Bavaria has St. Hubert (1444), a very exclusive order; St. George, dating from the crusades, but revived in 1727; and many later. Few of the other German states have old orders, except Baden, which has the Order of Fidelity (1715); but each state has an order. Belgium has the Order of Leopold (1832). Denmark has the Order of the Elephant, a valued order dating from 1464, and the Dannebrog (1693). France had, before the fall of the monarchy, the Holy Ghost (St. Esprit), 1579, St. Louis (1693), and minor orders; since the revolution there has been but one the Legion of Honour, founded by Napoleon I. in 1802. Greece has the Order of the Redeemer (1833); Holland, Order of Wil-liam (1815); Netherlands, the Lion, and the family Order of the Golden Lion. Italy has the Annunciata (an old order re-Annunziata (an old order revived by Charles III. of Savoy in 1518, and of very high rank), in 1518, and of very high rank), 8t. Maurice and St. Lazarus, the Crown of Italy, etc. The Papacy has St. Gregory the Great (1831), the Order of Christ (1318), the Orders of the Holy Sepulchre and St. Sylvester (which are of old but doubtful origin), and other minor orders used as decerations for piety. Prussis has no very old order; but it has the important Black Eagle (founded in 1701), the Red Eagle (1705), and the Order of the Crown (1861). Russia has no very old order either. The highest is the Order of St. Andrew, founded by Peter I. (1698); others are St. Catherine, Alexander Nevski, St. George, St. Vladimir, etc., and the Polish Order of the White Eagle. Sweden has the Order of is Taphim (an old order revived in 1748), Vasa (1772), and the Order of Charles XIII. (1811), which is singular as being limited to Freemasons. Turkey, as chief order, has the Medjidieh, founded by Abdul-Medjid in 1850.

See Adrian Schoonebeek's Historie van alle Riddevlyke en Krygs Orders (1697), Clark's Concise History of Knighthood (2 vols. 1784), F. C. Woodhouse's Military Orders of the Middle Ages (1879), Major J. H. Laurence-Archer's Orders of Chivalry (1887), P. L. Simmonds's British Roll of Honour (1887), and Gritzer's Hundbuch der Ritter und Verdienstorder aller Kulturstatten der Wett (1893).

Ordinaries. See HERALDRY.
Ordinary is a term applied to bishops and their chancellors, generally in Acts of Parliament referring to the exercise of their jurisdiction. For Lord Ordinary (Scottish courts), see COURT OF SKESION.

Ordinate is the name originally given to what is now more usually called the y co-ordinate in the Cartesian system of coordinates, the x co-ordinate being named the abscissa.

Ordination, the ecclesiastical act by which one is set apart for the ministry of the church. The letter of Dionysius of Alexandria, known as the Hippolytean Canons, contains directions and formulas for ordination, among other rites. The Testament of our Lord contains 'the essential parts of the liturgy, the baptismal and ordination services of an even earlier date (250-380). The Apostolic Constitutions and the Sucramentury of Scrapion also contain forms. The English Book of Common Prayer contains offices for the ordination of deacons and priests, and the consecration of bishops, in which a valid succession is insisted upon. (See the Preface to the Ordering of Deacons.) The Anglican Church recognizes only such ordinations as have been effected by bishops who have been themselves duly consecrated. In the Presbyterian churches the power of ordination rests with the presbytery, who appoint one or more of their number to perform the service, which includes the laying on of hands. Some of the smaller Protestant denominations have no ordination ceremony.

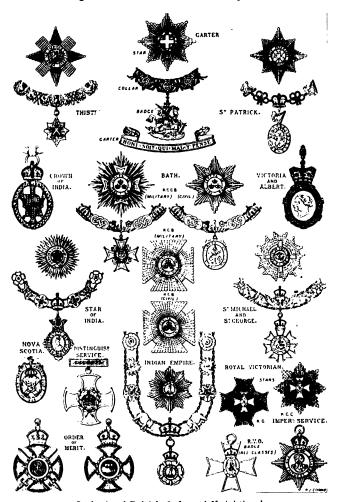
Ordnance. See Guns, Artil-

Ordnance College, at Woolwich, furnishes instruction to officers and to artificers in the

scientific branches of artillery, and in the technical knowledge special to artillery service and to the manufacture of stores. Officers, warrant officers, and artificers of the Royal Navy are also admitted to particular courses of instruction. Officers who pass the final examination of the advanced class in the college have the letters

final examination of the advanced class of the college.

Ordnance Committee. As far back as the year 1455 a Board of Ordnance was established at the Tower of London for the purpose of managing the supply of military arms and stores of all kinds, and for the provision of the men requisite for their managing the men requisite for their managing the supply of the men requisite for their managing the men requisite for their managing the supply of the men requisite for their managing the supply of the men requisite for their managing the supply of the supply of



Insignia of British Orders of Knighthood.

p.a.c. printed after their names in the Army List. The establishment of the Ordnance College is a commandant and an adjutant, with six military and five civil professors and instructors. The officers thus employed all belong to the Royal Artillery. Officers qualifying for positions on the inspection staff of warlike and general stores are required to have passed the

nipulation. At the head of this board was the 'master (afterwards the master-general) of the ordnance.' In 1855 the Board of Ordnance and its master-general were abolished. The old title of master-general of ordnance was revived in 1904, and is now held by the fourth military member of the Army Council. He has control of the whole of the ord-

nance and equipment of the army, together with the fortifications and defence works. Since the early part of the 19th century a standing committee, the name of which was changed at various times, existed for the consideration of all questions concerning artillery guns, carriages and appliances, and ammunition, as well as for examining and reporting on inventions and improvements. From 1859 to 1868 this body was known as the Ordnance Select Committee; in the latter year it was abolished, but was reconstituted as the Ordnance Committee in 1881. It is composed of persons having special knowledge of the subjects with which it has to deal, and is of a mixed character, comprising officers of the army and navy and civilian members. There are also associate members, officers and civilians, who have special technical knowledge of some particular branch of artillery or science bearing thereon.

Ordnance Survey. The Ordnance Survey is now under the Board of Agriculture; but inasmuch as the work was originated by officers of the Royal Engineers under the Board of Ordnance, and is still carried on by officers and men of that corps, it remains a semi-military institution. survey was begun, for military purposes, in 1747; but it was not until 1783 that the great base was measured and the trigonometrical survey commenced. When the Board of Ordnance was abolished in 1855, the direction of the work was placed under the War Office. In 1870 it was transferred to the Board of Works, and finally, in 1890, to the Board of Agricul-ture and Fisheries.

The original map of Great Britain, ordered in 1797, was published on a scale of 1 inch to the mile. The survey of Ircland, on a scale of 6 inches to the mile, was ordered in 1824. In 1840 the survey of Scotland and of the six northern counties of England was begun on the same scale. In 1855 the surveys were ordered to be on the following scales: able for 1 inch to the mile), taken (or 6 inches to the mile) for the whole United Kingdom; the of the state of

mile), for all cultivated districts; sb (or 12672 inches to the mile) for all towns of over 4,000 inhabitants. There are also surveys of the United Kingdom on scales of 2, 4, and 10 miles to the inch. See SURVEYING AND LEVELLING, and White's The Ordnance Survey of the United Kingdom (1885).

The department has also the duty of preparing maps for all military purposes, and of copying those prepared by the intelligence division of the War Office.

The personnel consists of four survey companies of the Royal Engineers, with their centres respectively at Bristol, Dublin, Belfast, and Southampton (head-quarters of the department). Three survey sections, each of 1 officer and 6 non-commissioned officers and men, are maintained complete for service with an army in the field.

Ordovices, the Latin name of an ancient British tribe who dwelt in the north-west of modern Wales.

Ordovician. After a long controversy between Murchison and Sedgwick as to whether certain beds in Wales belonged to the Cambrian or to the Silurian system, Lapworth suggested that a new system, the Ordovician, should be erected to receive them. The lowest subdivision is the Arenig, the middle the Llandeilo, and the uppermost the Bala or Caradoc. They consist of grits or greywackes, with some conglomerates, shales, and two well-marked limestones, of which the best known is that of Bala. Volcanic activity prevailed, especially in Arenig and Bala times, and great sheets of ashes and masses of lava are intercalated with the sedimentary rocks. Much of the bold and picturesque scen-ery of N. Wales is due to the presence of these hard and durable crystalline rocks among the softer grits and shales, Snowdon in large measure being built of these volcanic materials.

In the Lake District Ordovician rocks have a large development, and include the upper part of the Skiddaw slates (Arenig) and the Borrowdale volcanic series, while the Coniston limestone in this quarter. In the south of Scot-

land the typical members are a fine, hard, red or gray flint, filled with the shells of Radiolaria and dark, black, coaly-looking shales, crowded with graptolites. It is evident that deep-water cor ditions prevailed there, and me organic oozes and black muds slowly gathered on the ocean floor. Ordovician rocks are known in Cornwall and in several parts of Ireland, in Scandinavia, Russia, Germany, Bohemia, France, Spain, and the Alps. The most interesting and most completely studied are those of Bohemia and of Sweden. The North American Ordovician exhibits a remarkable development. Its subdivisions and successive faunas form a general parallel with those of Bohemia and Britain. The Calciferous and Chazy represent the Arenig, the Trenton limestone and Utica shales correspond to the Llandeilo, while in the Cincinnati or Hudson R. group the Bala fossils are found. In Australia, India, S. America, China. and Siberia the presence of Ordovician strata has been recorded, but as yet they are not known to occur in Africa.

In the fauna of Ordovician times, while the trilobites, cephalopeds, brachiopeds, and mollusca are in most respects similar to those of the underlying Cambrian system, the graptolites have greatly increased in numbers and in variety. Each subdivision of the strata is marked by its characteristic species. In the Arenig, Bryograptus, Tetragraptus, and various species of Didymograptus prevail; the Llandeilo is marked by Canograptus and Didymograptus Murchisoni; while in the Caradoc the zonal forms are Pleurograptus, Dicellograptus, and Dicranograptus. The presand Dicranograptus. The presence of curious fossil fishes in the Ordovician beds of N. America has been reported; but none have as yet been found in Great Britain.

In Britain Ordovician rocks yield lead, silver, graphite, flags, and slate. The volcanic rocks are also very extensively quarried for road-mending. The American Ordovician contains lead and iron ores, and from the Trenton limestone supplies of natural oil and gas have been obtained.

APPENDIX OF PRONUNCIATION.

I. GENERAL SCHEME.

In the system of transliteration here adopted the following points are to be carefully noted. Our main object being to give an approximately correct idea of the actual pronunciation of difficult English and foreign words, the scheme is purely phonetic. But perfect accuracy being impossible, no attempt is made to reproduce all the more subtle sound dis-tinctions which make elaborate phonetic treatises so deterrent, and would here defeat their own purpose by overburdening the text with endless dia-critical marks and bewildering the ordinary reader. Note that of classic names both the English and foreign pronunciations are given; thus-Acis = a'sis or a'kis.

In general all the unmarked vowels are to be taken as short. Thus-

a = a in fat. e = e in met. i = i in fit. o = o in not.

 $\mathbf{u} = \mathbf{u}$ in but.

So also the few short diphthongs that may be needed-

au = ou in pound. oi = oy in boy.

All long vowels and diphthongs, except the conventional oo, where no mark is needed, are marked, as under-

ā = a in fate. ä = a in far.

s = a in fall, or a in awe.

 $\ddot{\mathbf{e}} = \mathbf{e}$ in mọ.

ī = i in mine, or ai in aisle.

 $\bar{o} = o$ in mote.

00 = 00 in moon, or urin put. ū = u in mute, or ew in few; also French u.

Consonants are normally as in English. Special points are :-

c discarded, being = either to s in sit or k in

ch in classic names = k or kh, as in Chaos, Chares; elsewhere as ch in chin, or as Keltic ch in loch.

dh = th in then.

q = g in give, go: always hard.
j = j in joy.
q discarded, being with u, which always follows it = kw.

th = th in thin.

 $\mathbf{w} = \mathbf{w}$ in wet: is never a vowel.

x discarded, being = ks or gs.

y = y in you: is never a vowel.

z = z in zeal.

zh = s in treasure.

Special Values (mostly makeshifts).

= Semitic ain (Arabic and Hebrew), as in 'abd, slave.

e = e mute (Hebrew and French), as in yab'ddi, d'ha (de la).

separates the aspirate in the aspirated letters of Hindi, Urdu, and the other neo-Sanskritic languages. Thus b'hag, p'hal, t'hop, g'har, ch'har, etc. gh = ghain (Arabic), as in gharb, the west.

e = French eu, œi, œu. ch = Keltic and German ch, as in loch.

n = nasal n (French, Portuguese, Arabic, etc.), as in mon, nação, fauran, etc. ly = palatal l in William; French ll in vola-

ille; Italian gl in egli.

ny = French and Italian gn in seigneur, signore; Spanish fi and Portuguese nh. as in señor, senhor.

h = strong Semitic (Hebrew and Arabic) h, as in bahr, sea, river.

' = stress, as in pres'ent, pre-sent'.

II. EUROPEAN ORTHOGRAPHIC SYSTEMS.

In all the cultivated European tongues the written systems are based mainly on the Latin and, in a few instances, on the Greek alphabet, both of which have been adapted with more or less success to the several phonologies. Most of these tongues having a common Aryan origin, although belonging to different branches—Hellenic, Italic, Teutonic, Keltic, and Letto-Slavic—their phonetisms correspond in a general way, so that the greater part of the original letters have been adopted without any change. Thus all the vowels and diphthongs, both long and short, are generally as in the former pronunciation of Latin, and as still pronounced in its eldest daughter, Italian:-

a = a in far, almost everywhere.

e = a in rare (open), or a in favour (shut). i = i in fit (short), or i in machine (long).

o = o in hope (open), or o in for (shut).

u = u in rule.

Of the consonants, b, d, f, l, m, n, p, q, r, t, v are nearly everywhere as in English, which has here remained more faithful to the old Teutonic (Gothic), and to some extent even to the organic Aryan, than most of its congeners. Hence, in most phonetic schemes the rule is to take the Italian vowels and the English consonants as normal.

All other shiftings and devices which the European tongues have had recourse to in order to express sounds not provided for in the Greek and Latin alphabets will now be explained.

ITALIAN.

c = k before a, o, u—cane = kä'nā; = ch before e, i
—cena = chā'na. ch = k; chi, che = ki, kā—chiesa
= ki-ā'sa. g = g before a, o, u—gatto = gat'to; = j
before e, i—genio = jā'ni-o. gh = g—ghianda = giān'da. gu = gw—nuerra = gwer'ra. gl in open syllables = ly—cgli = 6-lyi; in closed syllables = gl—
negligenza = nā-gli-jen'tsa, gn = ny—Bologna = bōlō'nya. h is silent and little used except in combination with c and g as above. j final = i or ii—studj
= stoo'di, or stoo'di-i; elsewhere = semi-vowel y—

 $gioja = j\bar{o}'ya$. qu = kw-quando = kwan'do. s inigioja = jō'ya. qu = kw-quando = kwan'do. s initial and before another consonant = s-sono = sō'nō; elsewhere mostly = z-paese = pā-ā'zā; but also pā-ā'sā. sc = sk before a, o, u-scoglia = skō'lya; sh before e, i-scimia = shō'mi-a. sch = sk-schiavo = ski-ā'vo. z = ds, ts, or z; as an initial, frequently the former—zoppo = tsop'po; zelo = zā'lō. The same rule applies to zz. Double consonants are propunced apparately as latte = lat'tā. k x v w are nounced separately, as latte = lat'ta. k, x, y, w are not used.

Accent—grave only is in use; falls on all the vowels, which are then uttered with a strong stress:

città, è, dì, darò, giù. Examples as here given need not be repeated, as these will suffice to show how the general indications are to be applied.

FRENCH.

 $a = \ddot{a}$. $a\dot{i} = \bar{a}$. $a\dot{u} = \bar{o}$. e (when not mute) = \bar{a} . ei = a. eu, œi, and œu somewhat like e in her. i i and \bar{e} . o = o and \bar{o} . $oi = w\ddot{a}$. $u = \bar{u}$ nearly. All

vowels may be nasalized.

vowers may oe nasalized.

c = k before a, o, u; = s before e, i. c = s. ch = sh normally. g = g before a, o, u; = zh before e, i. gn = gn Italian. gu = g (the u being generally mute). h absolutely silent. j = zh. ll = gl Italian, but fainter. qu = k usually, but = k before e, i. r final, generally mute; elsewhere = r, but more trilled. s final mute: elsewhere = s and z, as in the z ti often = si. x = ks and cs. English th = t. ti often = si. x = ks and gs normally; between vowels = s or z-cf. Bruxelles, Auxerre (s), dixième (z); x final (when not mute) = z. y semi-vowel = y; $vowel = i \text{ and } \tilde{e}$. $z = z \text{ normally, but } Mctz = m\tilde{a}s$.

Accents—acute ('), grave ('), circumflex ('),

SPANISH.

Vowels mainly as in Italian. When stressed, all

may take the acute accent; none other is in use.

b = b. c = k before a, o, u; = th before e, i.
ch = ch. cu = kw before a; = coo before e, i. o. d = d, but in some provinces almost = dh. g = g before a, o, u; = h (guttural) before e, i. h always mute. j = h (guttural). Il = ly. $\hat{n} = gn$ Italian. qu = k before e, i; elsewhere not used. $gua = gw\ddot{a}$. sometimes nearly w; gue = $g\bar{a}$; gui = $g\hat{i}$. s is always sharp.

There are no double letters except ll and rr. hence

pasion, gramática, etc.
Of all European systems Spanish is the most purely phonetic, all letters being distinctly uttered with one invariable sound.

ROUMANIAN.

Vowels mainly as in Italian, but initial e = ve in yet, and I nearly = French u in un.

c = k before a, o, u; = ch before e, i. d = z. g = g before a, o, u; = j before e, i. h = ch in loch. j = zh. s = sh. t = ts. x = ks. y = i. z = z.

GERMAN.

a=ä; ä=ä; ai=ī; au=ou; äu=oy in joy.
e=e; ei=ī. i=i and ō; ie=ē. o=o and ō; ö=e
in her, but longer. u=oo; ü=French u. y=ē.
c=k before a, o, u; =ts before ä, e, i. ch=ch
in loch. chs=x. g=g generally. h=h. j initial=y. qu=kw nearly. s initial=z; elsewhere
=s. ss=s. th=t, and now so written-tun=
thun. tech=ch. dech=ii sch=sh. y=f. w thun. tsch = ch. dsch = j. sch = sh. v = f. w= v. z = ts.

DUTCH.

 $aa=\ddot{a}$. $ee=\ddot{a}$. $oo=\ddot{o}$; oe=oo; ou=ou. $ui=o\dot{a}$. eu = French eu. uu = 00, u = ti. ei and ij (in some provinces y) = i. The consonants are as a rule pronounced as in English. g is a strong guttural. sch = sk (k guttural). tj = ch. w as in English, but a little softer. j = y.

DANISH.

a=a and ä; aa and å=ō. e and ee = e and å.
i=i and ō. o=o; ø and ö = German ö. u=oo.
æ=a close e, like the French é. y = French u.
c=k before a, o, u; =s before the other, overlie, ch=k, d and dd = dh after a vowel or between two vowels. g=g. h=h, j=y, qv=kv. w not in use. x initial = z nearly; elsowhere eks, gs. z=z, dz, and ts. k before we k vowels (kj in Norway) = ch. sk or skj = sh.

Note:—b, d, g, and v (when not initial) are so soft as to be scarcely a udible in some districts.

soft as to be scarcely audible in some districts

Standard Norwegian is about the same as Danish, allowing for local differences.

SWEDISH.

a, i, u as in Italian; å = ō; ä = ā. e = e and ā. o = o, \bar{o} , and sometimes oo nearly; $\ddot{o} = e$ in her, but

longer.

c = k before a, o, u, \hat{a} : = s before other vowels. dt = t. nd final = n nearly. dj = y. f final = v; dt=t. nd hnal=n nearly. dj=y. f hnal=v; elsewhere = f, but often mute. g = g generally; before e, i, ä, ö, and after l and r, = y; = k before t; is mute before j-gjordt = y ort. h = h, but is mute before j and v. j = y. k = k generally, but often = y, and before e, i, ä, $\delta = ch$. qv = kv. s = s, but stj, sj, and skj = sh. sk = sh before e, i, ä, ö. tj = ch. v = v. v = ks. v = ks.

BOHEMIAN (CHEKH).

 $\mathbf{a} = \mathbf{a}$; $\mathbf{\dot{a}} = \mathbf{\ddot{a}}$. $\mathbf{e} = \mathbf{e}$; $\mathbf{\dot{e}} = \mathbf{\ddot{e}}$ is $\mathbf{\ddot{e}} = \mathbf{\dot{e}}$ in yet; $\mathbf{e}\mathbf{\dot{y}}$ $\mathbf{\ddot{e}}$ is $\mathbf{\ddot{e}} = \mathbf{\ddot{e}}$; $\mathbf{\dot{i}} = \mathbf{\ddot{e}}$. $\mathbf{\dot{e}} = \mathbf{\dot{e}}$; $\mathbf{\dot{e}} = \mathbf{\ddot{e}}$; ou = 0-00. $\mathbf{\dot{u}} = \mathbf{\dot{e}}$ 0;

= a. 1 = 1; 1 = e. 0 = 0; 0 = 0; 0u = 0-00. u = 00; and \hat{u} = 00. y = French u. c = ts, even before k—necky = $nets'k\hat{u}$; δ = ch. ch = ch in loch. d before i, i = dy. g = g. h = h; but h final = ch in loch nearly. j = y. δ and δ = sh. t before i, i = ty. z = z. δ = zh.

POLISH.

a, e, i, o, u, ii as in German. a and e are nasals (ap, ep). 6=i-ā. y=French u. b=by, and other accented consonants are similarly palatalized with inherent y. c=ts; cz=ch; ch=k or kh. dz=dz; dz=j. h (rare) = German ch. j=y. k=g I Italian. rz=rzh. sz=sh. w=v. z=z; z=zh.

SERVIAN, DALMATIAN, AND CROATIAN.

a, o, u, i, e as in German. & or ie = ye in'yes; follows all consonants except the gutturals.

c and cz = ts. c and ch = ts nearly. c and cs = j. dj, dy, gj, and gy = j nearly. g = g. h = h. j = y. lj and ly = gl Italian. nj and ny = gn Italian. a, ss, and sz = s; δ and sc = sh, and so written in Slavonia, z = z. δ and x = zh. dz, dx, $\mathbf{ex}, \mathbf{ds} = \mathbf{j}.$

Note:-r as a consonant = r, but r as a vowel is = er very faintly uttered. It is variously written er, ar (in Dalmatia), r and r (in Servia and Croatia).

HUNGARIAN.

a, e, i, o, ö, u, u as in German, only a sounds somewhat like o; all are lengthened with the acute accent—á, é, etc.

cs = ch; cz = ts. gy = di in French Dieu. j = y. ly = gl Italian, but much softer, the l barely heard. ny = gn Italian. s = sh; sz = s. ty = ti in French métier (tyuk = ty-ook). v = v. z = z. zs = j.

Note:—cs and cz are now often written ts, tz. y has no independent sound, but blends with the antecedent consonants l, n, etc. c, ch, q, w, and x are wanting, except in foreign words—Cato, Achilles, etc.

VOLUME VII.—Log to Ordovician.

Logania, lō-gan'i-a. Logarithms, log'a-rithmz. Logau, lo'gou. Loggia, loj'ji-a. Logia, lo'gi-a. Logone, lõ-gõ'na. Logroño, lo-grô'nyo. Lohardaga, lo-har dug'a. Loharu, lo-ha-roo'. Lohengrin, lô'en-grin. Loigny, lwa-nyi'. Loire, lwär. Loire Inferieure, lwar anfa.ri.er' Loiret, lwa-ra'. Loir-et-Cher, lwar-a-shar'. Lokeren, lok'er-en. Lokhvitsa, loch-vit'sa. Lolos, lõ'lõz. Lomaria, lo ma'ri a. Lomatia, lō-mā'shi-a. Lomatophyllum, lo-ma-tōfil'um. Lom-Palanka, lom-pa-lan'ka. Lomza, lom'zha. Longchamp, long-shan'. Longinus, lon-ge'noos or lon-jī'nus. Lons-le-Saunier, lon-l'-soni-ā'. Loochoo, loo-choo'. Lope, lô'pā. Lopez, lo'peth. Loquat, lo'kwat. Loranthacess, lo ran-tha'-RA-Ā. Lorelei, lō'r'-lī. Lorenz, lo-rents'. L'Orient, lo-ri-an'. Loriquets, lö-ri-kets'. Loris-Melikoff, lo'ris-mel'i-kof. Lörrach, ler'a h. Lorraine, lor-ran'. Los Andes, lôs-an dás. Los Angeles, los-an'hā-lās or los an'je-lez. Los (islands), lös, Losonez, lo-shonts'. Lot-et-Garonne, lot-a-garōn'. Lotophagi, lō-tof'a-gī. Lotze, löt'sa. Loubet, loo-ba'. Loughborough, luf'bur'. Loughrea, loch ra'. Louisburg, loo'is-burg. Louis-d'Or, loo-i-dor Louisiade, loo-ex-i-ad'. Louis, loo'la. Lourdes, loord. Lourence Marques, looren'so mar-kās'. Louvain, loo-văn' Louviers, loo-vi-a'.

Louvre, loo'vr'. Löwenberg, le'ven-berg. Loyola, lo-yō'la. Lozère, lo-zar'. Luang-Prabang, loo-ang'-.pra-bang'. Lubao, loo-ba'o. Lübeck, lü'bek. Lublin, loo'blin. Lubni, loob'ni. Luca della Robbia, loo'ka del'la rob'bi-a. Lucca, look'ka. Lucena, loo-tha'na. Lucera, loo cha'ra. Lucerne, loo-sern'. Lucian, loo'si-an. Lucilius, loo-ke'li-oos or loo-së'li-us. Lucina, loo-ke'na or loosë'na. Lücke, lū'ka. Luckenwalde, look'en-valda. Luçon, lū-son'. Lucretia, loo-krā'ti-a or lookrē'sha. Lucretius, loo-krā'ti-oos or loo-krē'shi-us. Lucrinus Lacus, loo-krē'noos lä'koos. Luculia, loo-kū'li-a. Luculius, loo-kool'loos or loo-kul'lus. Lüdenscheid, lü'den-shit. Ludhiana, loo-d'-hi-a'na. Ludinovsk, loo-din-ovsk'. Ludwig, lood'vig. Ludwigsburg, lood'vigsboorg. Ludwigshafen, lood'vigshä-fen. Luganskaya Stanitsa, loogan-ska va stan-ēt'sa. Lugo, loo'go. Lugos, loo'gosh. Luini, loo-e'ni. Luino (Luvino), loo-e'no (loo-ve'no). Luisia, loo-ĉz'i-a. Lule, loo'la. Luleå, loo'la-o. Lull (Ramon), lool (ramôn'). Lully, lool'li or lu-li'. Lunardi, loo-nar'di. Lunawara, loo-na-wa'ra. Lunda, loon'da. Lundenburg, loon'denboorg. Lüneburg, lü'na-boorg. Lunenburg, lun'en-boorg. Luneville, lū-na-vēl'. Lung-chou, loong-chou' Lupercalia, loo-per-ka'li-a or loo-per-kā'li-a,

Lupulin, loo'pū-lin. Luray, lur-ā'. Luria, loo'ri-a. Lusatia (Lausitz), loo-sā'sha (lou'zits). Lusnai, loo-shi'. Lusignan, lū-si-nyan'. Lusitania, loo-si-ta'ni-a. Lussin, loos'sin. Lustrum, lus'trum. Lutetia Parisiorum, lootā'ti-a pa-rē-si-o'room. Luthardt, loot'hart. Lutsk, lootsk. Luttringhausen, loot'ringhou-zen. Lützen, lüt'sen. Lützow, lūt'so. Luxembourg,lüks-an-boor'. Luxemburg, luks'em-boorg. Luxeuil, lüks-el' or lus-el'. Luynes, lwen. Luz, lūs. Luzan, loo-than'. Luzon, loo-thon'. Luzula, loo'zū-la. Luzzati, loo-dzä'ti. Lwoff, l'uof. Lycabettus, lū ka-bet'oos. Lycanthropy, li-kan'thropi. Lycaon, lü-kä'on or li-kā'on. Lycaonia, lū-ka-o'ni-a or lī-ka-ō'ni-a. Lycaste, lī-kast'e. Lychnis, lik'nis. Lycia, lū'ki-a or lē'shi-a. Lycium, lis'i-um. Lycomedes, lü-kö-mā'dās or lī-kō-mē'dēz. Lycoperdon, li-ko-per'don. Lycophron, lu-kof ron. Lycopodium, lī-ko-pō'dium. Lycurgus, lū-koor'gos or lī-kur'gus. Lydenburg, li'den-boorg or li'den-burg. Lydia, le'di-a. Lygodium, lī-go'di-um. Lynceus, lûn-ka'oos or lînsé'us. Lyonia, lī-ō'ni-a. Lyonnais, li-on-na'. Lys, les. Lysander, lu-san'dar or lisan'der. Lysias, lū'si-as or lī'si-as. Lysimachia, li-si-mā'ki-a. Lysimachus, lū-si'ma-choos

or lī-sim'a-kus.

sip'pus.

Lysippus, lu-sip poos or li-

Lystra, lüs'tra or lis'tra.

Lythracess, lī-thrā'se-ā.

Maastricht, mäs'tricht. Mabillon, ma-be-yon'. Mabinogion, ma-bin-ô'gion. Mably, ma-blē'. Mabuse (Jan), ma-būz' (van). Macedonia, ma-kā-dō'ni-a or ma-se-dō'ni-a. Maceis, ma-sās'. Macerata, ma-chā-ra'ta. Machærodus, ma-ke'ro-dus. Machiavelli, ma-ki-a-vel'li. Mackaya, ma ki'a. Macon, mä-kop'. Macrinus, ma-cre'noos or ma-krī'nus. Macrozamia, ma-kro-zā'mi-a. Madava Rao, ma-da'va-ra'o. Madeira, ma-dā'ra or ma-**Ma**dha**va A**chárya, mä'd'ha-va a-char'ya. Madhu Sudan Datta, ma'd'hoo soo'dun dat'ta Madridejos, mä-dri-da'hōs. Mmander, må-an'dår or mëan'der (Gr. mī'an-dros). Mæcenas, mā-kā'nas or mē-sē'nas. Maelström, mäl'strem or māl'strum. Maerlant, mär'lant. Maeterlinck, met'er-link. Mafeking, māf'king. Maffei, maf-fā'i. Magadha, mä'ga-d'ha. Magallanes, ma-ga-lya'nās. Magdala, mag'da-la. Magdalena, mag-da-la'na. Magdeburg, mag'da-boorg. Magellan, ma-gel-yan' or ma-gel'lan. Maggiore, maj-jö'rä. Magilus, maj'il-us. Magister equitum, maj-is'ter e'qui-tum. Magliabechi, ma-lya-bek'i. Magna Charta, mag'na kar'ta or char'ta. Magnesite, mag'ne-zīt. Magyars, mod-yors' or magyarz'. Mahabaleshwar, bul-esh-war'. Mahabalipur, ma-ha-bul-ipoor'. Mahabharata, ma-hä-b'hä'ra-ta. Mahanadi, ma-hä-nud'i. Mahanaim, ma-ha-na'em or ma-ha-na'im. Mahanoy, mā-ha-noi'. Maharajnagar, ma-hä-räj'nug-ur.

Mannheim, man'hīm. Manresa, man-ra'sa.

Mahavansa, ma-hä-van'sa. Mahavira, ma-ha-ve'ra. Mahdi, mah'di. Mahé, ma-á'. Mahikantha, ma-he-kan't'ha. Mahim, ma-hēm'. Mahmud, mah mood'. Mahurea, ma-hoo'ri-a. Mahuwa, ma hoo'wa. Mai, mī. Maia, mī'a. Maikop, mi'kop. Maimachin, mī-ma'chin. Maimansingh, mì-munsing'. Maimbourg, mam-boor'. Maimon, mī'mon. Maimonides, mī-mon'i-des or mī-mon'i-das. Main, min. Maine - et - Loire. mān-ālwär'. Mainots, mī'nots. Mainpuri, min-poo'ri. Maintenon, man t' non'. Mainz, mints. Maiorescu, mī-or-ā'shoo. Mairia, mā'ri a. Maistre, mas'tr'. Maiwand, mi'wand. Majolica, ma yol'i ka. Majorca (Mall rca), major'ka (ma-lyor'ka). Majunga, ma-joon'ga. Makaroff, ma-kar-of'. Makkari, mak'ka-ri, Mako, mo ko'. Makololos, ma-ko-lö'los. Makrizi, ma-kre'zi. Malabari, ma-la ba'ri. Malachite, mal'a-kit. Malachy, mal'a-ki. Malacopterygii, ma-la-kopter-ij'i-i. Malacostraca, ma-la-kos'tra-ka. Malakoff, ma-la-kof' (Fr.) or mal'a-kof (Eng.). Malan, ma-lan'. Malapterurus, mal-ap-terū'rus. Mälar, mā'lar. Malatia, ma-la-tê'ya. Malchin, mal'chin. Maldeghem, mal'd'-gem. Maldonado, mal-do-na'do. Malebranche, mal-bransh'. Maler Kotla, ma-lur-kot'la. Malesherbes, mal-zerb'. Malerbe, ma-lerb'. Malibran, ma-li-bran'. Malines, ma-lēn'. Mallarmé, ma-yar-mã'. Malmaison, mal-mā-zon'. Malmesbury, mamz'b°-ri or mamz bury. Malmö, malm'e. Malmsey, mam'zi. Malmström, malm'strem. Malope, mal'op-ë. Malpighi, mal-pē'gi.

Malpighia, mal-pē'gi-a. Malplaquet, mal-pla-ka'. Malstatt - Burbach, mal'. stat-boor-bach'. Ma.tebrun, mält-brun'. Malvaces, mal-va'se-ē. Malvastrum, mal-vas'trum. Mamelukes, mam'e-lüks. Mamers, ma-mār'. Mamiani della Rovere, ma-mi-ä'ni del'la ro'vā-rā. Mamilius, ma-mil'i-oos or ma-mil'i-us. Mammea, mam'mi-a. Mammillarıa, mam-mil-lā'ri-a. Mamore, ma-mo-ra'. Manacor, ma-na-kôr'. Managua, ma-na gwa. Manaoag, ma-na-o'ag. Manaos, ma-na'os. Manasarowar, ma-na-saro-war'. Manatee, man-a-të'. Manbhum, man-b'hoom'. Manche, mansh. Manchineel, man-chi-nel'. Mancini, man che'ni. Mandmans, man-de'anz. Mandalay, man'da-la. Mandamus, man-da'moos or man-dā'mus. Mandaue, man-dou'ā Mandeville, man'de-vêl. Mandingans, man-ding'anz. Mandla, man'dla. Mandogarh, man-dō-gur'. Mandsaur, mund-sour'. Manduria, man-doo'ri-a. Mandvi, mand'vi. Manes, ma'nās or mā'nēz. Manet, ma-na'. Manetho, ma-na'tho or ma-ne'tho. Manettia, ma-net'ti-a. Manfredonia, man-fre-do'ni-a Mangalore, mang-a-lor'. Mangishlak, man-gishläk' Manglaur, mang-lar'. Mangonel, mang'o-nel. Mangosteen, mang'ō-sten. Manichæism, man'i-kë-ism. Manihiki, man-i-hē'ki. Manihot, man'i hot. Manikaland, man'i-ka-land or ma-nik'a-land. Manilius, ma-nil'i-oos or ma-nil'i-us. Manipur, man-i-poor'. Manitoha, man-i-tö'bä or mau i to ba'. Manitou, man'i-too. Mani oulin, man-i-too'lin or man-i-too'len. Manlius, man'li-oos or man'li-us. Mannargudi, mun-när'gud-i.

Manrique, man-re'kā. Mans, man. Mansûrah, man-soo'ra. Mantegna, man-te'nya. Mantes, mant. Manteuffel, man toi'fel. Mantinea, man ti-na'a or man-ti-ne'a. Mantras, man'tras. Mantua (Mantova), man'tū-a (man'tō-va). Manu, ma'noo. Manutius Aldus, ma-noo'ti-oos al'doos. Manzanares, man-than-a'rās. Manzanillo,man-than i'lyo. Manzanita, man-zan-ē'ta. Manzoni, man-tso'ni. Maori, ma'ô-ri. Magui, ma'ki. Marabouts, ma-ra-boots'. Maracaibo, ma-ra-ki'bo. Maracci, ma-rach'chē. Maragha, ma'ra-ga. Maragogipe, ma-ra-go-zhē'pā. Marajo, ma-ra-zho'. Maramaros Szighet, mar'om-or-osh se'get. Maranhão, ma-ra-nyan'. Marano di Napoli, ma-ra'no di na'po-li. Maraschino, ma-ras-ke'no. Maraemius, ma-raz'mi-us. Marat, ma-ra'. Maratha, ma-ra't'ha, Maravedi, ma-ra-vā'di. Marcabrun, mar-ka-brun'. Marcantonio, mar-kan-tō'ni-o. Marceau, mar-so'. Marcello, mar-chel'lo. Marcet, mar-sã'. Marchantia, mar-kan'ti-a. Marchesi, mar kā'si. Marchetti, mar-ket'ti. Marchfeld, march'felt. Marchienne-au-Pont, marshi-en'-o-pon'. Marcianise, mar-cha-ne'sā. Marcomanni, mar-koman'i. Marconi, mar-kō'ni. Mardin, mar-den'. Marenzio, ma-ren'tsi-o. Margaux, mar-go'. Marggraf, margraf. Margrave, mar grav. Margyricarpus, mar-jir-ikar'pus. Marheineke, mar-hîn'a-ka. Mariazell, ma-rē'a-tsel. Marie de' Medici, mi ré' de med'i-chi. Marienbad, ma-re'en-bät. Marienburg, ma-re'enboorg. Marienwerder, ma-rê'enver-der. Mariette, mä-ri-et'.

Marigliano, ma-ri-lya'no. Marignac, ma-ri-nyak'. Marinduque, ma-rin-doo'kā. Marius, mä'ri-us. Mariut, ma-ri-oot'. Marivaux, ma-ri-vô'. Markirch, markirch. Marmande, mat mand'. Marmier, mar-mi-ă'. Marmont, mar-mon'. Marmontel, mar-mon-tel' Marochetti, ma-rō-ket'ti. Maronites, mar'on-its. Marot, mä-rô'. Marozia, ma-ro'zi-a. Marquesas, mar-ke'zas or mar-ka'sas. Marradi, mar-ra'di. Marsdenia, marz-den'i-a. Marseillaise, mar-sa-yaz'. Marse lles, mar-selz'. Marsivan, mar-si-van'. Marsyas, mar'sū-as or mar'-81-88. Martelli, mar-tel'li. Martens n, mar'ten-sen. Martial (Martialis), mar'shal (mar-ti-ä'lis). Martina Franca, mar-te'na fran'ka. Martineau, mar-tin-ō'. Martinezia, mar-tin-ez'i-a. Martini, mar të'ni. Martinique, mar-ti-nēk'. Martino, mar-te'no. Martius, mar'tsi-oos. Masaccio, ma-sa'chi-o. Masai-land, ma-si'land. Masaniello, ma-sa-ni-el'lo. Masbate, mas ba'tā. Mascagni, mas-ka'nyi. Mascara, mas-ka-ra'. Mascarene, mas-kar-ēn'. Masdevallia, maz-de-val'li-a. Masinissa, ma-si-nis'sa. Massafra, mas-sa'fra. Massage, mas-saj'. Massagetæ, mas-sa-gā'tā or mas-sa-gē'tē. Massa Marittima, mas'sa ma-rit'ti-ma. Massangea, mas-san'ji-a. Masséna, mas-sa'na. Massenet, mas-s'na' Massicot, mas'si-kot. Massillon, mas-si-yon'. Massorah, mas-sô'ra. Massowah (Massaua), mas'so-wa (mas'sou-a) Mastodon, mas'tō-don. Masudi, mas-oo'di. Matabili, ma-ta-bē'li. Matamoros, ma-ta-mô'rôs. Matanzas, ma-tan'thas. Mataro, ma-ta-ro'. Maté, ma'ta. Matera, ma-ta'ra. Matheran, ma-t'her-an'. Matsukata, ma-teoo-ka'ta Matsumoto, ma-tsoo-mô'-

Appendix of Pronunciation.

Matsushima, ma-tsoo-she'-Matsuvama, ma-tsoo-ya'ma. . Matsys, mat'sis. Best ei, mat ta'i. Matternorn, mat'ter-horn. Matthias Corvinus, mat-te'as kor-winoos. Matto Grosso, mat'to gros'-80. Mau, mou. Maubauge, mō-bezh'. Mauch Chunk, mouk chunk'. Maulmain, moul-mīn'. Mauna Kea, mou'na kā'a. Mauna Loa, lô'a. Maupassant, mô-pas-sap'. Maupertuis, mō-per-twe'. Maurel, mö-rel'. Maurepas, mō-r'pä'. Mauritania, ma-ri-ta'ni-a. Mauritius, ma-rish'i-us. Maurocordatos. may-rokor-da'tos. Maury, mō-re'. Mausolus, ma-so'loos. Maxentius, maks-en'ti-oos or maks-en'shi-us. Maximianus, maks-im-i-ā'nus or maks-im-i-a'noos. Maya-Quiché, mī'a-kē'chā. Mayas, mī'as. Mayen, mī'en. Mayenne, ma-yen'. Mazagan, maz-a-gan'. Mazanderan, maz-an-deran'. Mazarin (Mazzarini), madza-ran' (mad-za-rē'ni). Mazar-i-Sherif, maz-ar-isher-ēf'. Mazarrón, ma-thar-ron'. Mazatlan, math-at-lan'. Mazovia, ma-zo'vi-a. Mazzarino, ma-tsa-re'no. Mazzini, ma-tse'ni. Meagher, ma'er or ma'her. Meath, medh. Meaux, mo. Meckitarists, me-ki-tarists'. Meconopsis, mi-kon-op'sis. Medea, mā-dā'a or me-dē'a. Medici, mā'di-chi. Medina, med-ēn'a M. Sidonia, si-do'ni-a. Medinet-el-Fayum, medēn-et'-el-fī-yoom'. Meerut, mê'root. Megalichthys, megal-ik'-Megalopolis, meg-al-op'ol-

Megara, meg'ar-a.

Megasea, meg-as-6'a.

Megasthenes, meg-as'then6s or meg-as'then-āz

Megatherium, meg-a-thēr'i-um.

Meiningen, min'ing-en.

Meissonier, mā-son-i-ā. Meistersingers (Meistersänger), mis ter-sing-ers (mīs ter-zāng-er). Mekinez, mek-in-ez'. Meklong, mā-klong'. Mekong, ma-kong'. Mel ı, mā'la or mēl'a. Melaleuca, mel-al-ū'ka. Melanesia, mel-an-ē'shi-a. Melastoma, mel-as'tom-a. Melchites, mel'kits. Medola, med-ŏl'a. Meleager, mä-lä-a'ger or mel-e-āj'er. Meleda, mel'e-da. Melegnano, mel-e-nya'no. Melfi, mel'fi. Melia, mēl'i-a. Melianthus, mel-i-an'thus. Melilla, mel-i'lya. Melilotus, mel i-lo'tus. Méline, mā-lēn'. Melittis, mel-it is. Mellin, mel'lin. Meloria, mel-ōr'i-a. Melpomene, mel-pom'en-i. Melun, m'lun'. Melusina, mel-ū-sēn'a or mel-ū-sin's. Melzi, mel'tsi. Memmingen, mem'ming-en. Mena, mā'na. Menabrea, me-na-bra'a. Ménage, ma nazh'. Menander, men-an'der. Ménant, mā-nan'. Mencius, men'shi-us. Mende, mand. Mendeléeff, men-del-a'vef. M. Bartholdy, bar-tol'di. Mendès, man-daz'. Mendoza, men dö'tha. Menelaus, me-ne-la'oos or me-ne-la'us. Menendez y Pelayo, menen'deth i pel-a'yo. Menes, mā'nāz or mēn'ēz. Menfi, men'fi. Mengo, meng'o. Meng-tsu, meng-tsoo'. Menhaden, men-ha'den. Menhir, men'hir. Ménier, mā-ni-ā'. Menin (Meenen), m'nan' (mā'nen). Meningitis, men-in-jīt'is. Meniscium, men-is'si-um. Menispermacese, men-isper-mā'se-ē. Mennonites, men'no-nits. Menominee, men-om'in-ē. Menopome, men'o pôm. Menshikov, men'shi-kof. Mentana, men-ta'na. Mentone, men-tô'nā. Mantzelia, ment-zel'i-a. Menufich, men-oof-ē'yā. Menyanthes, men-i-an'thes.

Menzalen, men-za'lā.

Menzini, men-tse'ni.

Menziesia, men-zi-ĕ'si-a.

Menzel, men'tsel.

Mephistopheles, mef-is-tof'el-ēz. Mercadante, mer-ka-dan'-Mercier, mar-si-a'. Mercurius, mer-kū'ri-us. Mer d + Glace, már d' gläs'. Mer ndera, mer-en-da'ra or mer-en-der'a. Mergui, mer-ge'. Merida, mā'ri-da. Mérimée, mā-rē-mā' Merodach-Baladan, mer'odach-ba-la-dan'. Mercë, mer'ō-ā. Merseburg, mer'sa-boorg. Mersina, mer se'na. Merthyr-Tydvil, mer'dhertid'vil. Meru, márco. Méryon, mā-ri-on'. Mesembryanthemum, mesem-bri-an'them-um. Meshcheriaks, mesh-cheryakı'. Meshed, mesh'ed. Mesitylene, mes-it'il-ēn. Mesne, men. Mesozoa, mes-o-zô'a. Mespilus, mes'pil-us. Messageries Maritimes. mes säzh -rē' mär-ri-tēm'. Messalina, mes-sa-le'na or mes-sa-lin'a. Messenia, mes-sā'ni-a or mes-sēn'i-a. Mestre, mes'tra. Metapontum, met-a-pon'tum or met-a-pon'toom. Metastasio, me-ta-sta'si-o. Methane, meth-an'. Metheglin, meth-eg'lin. Metis, mā'tis or mēt'is. Meton, ma'ton or met'on. Metope, met'op-i. Metrosideros, mēt-ro-sīdēr'os. Metternich, met'ter-nich. Metz, mets or mas (Fr.). Meudon, me-don'. Meung, meng. Meunier, me-ni-a'. Mourice, me-res'. Meurthe-et-Moselle, mertā-mö-zel'. Meuse, mez. Mexia, mā'hi a. Meyer, mī'er. Meyerbeer, mi'er-bar. Mezere in, mez-er'i-on. Meziè es, mez-i-ar'. Mezquite, meth-ke'ta. Mezzofanti, med-zō-fan'ti. Mfumbiro, m'foom-be'ro. Mhow, m'hou. Miami, mi-am'i. Miani, mē an'ē. Miao-tse, mē-a-ô'ts'. Michaelis, mich al'is. Michaud, mē-shō'. Michel, mē-shel'. Michelangelo, me-kel-an'jel-o.

Michelet, mē-sh'lā'. Michoacan, mi-chō-ak-an'. Micon, mē'kon or mīk'on. Miconia, mik-on'i-a. Microlestes, mīk-ro-les'tēz. Micronesia, mīk-ro-nê'shi-a. Microstylis, mīk-ro-stīl'is. Midas, mē'das or mīd'as. Midhat Pasha, mēd'hat pa-sha'. Midi. mē-dē'. Midnapur, mid-na-poor'. Mieres, mi-ā'rās, Migne, meny Mignet, mē-nyā'. Mikhailov, mi-chil'ov. Miklosich, mi-klöz'ich. Milazzo, mi-lat'so. Miletus, mi-la'toos or mīl'ĕt-us. Millet, mē-yā'. Milo, fnē'lo. Milot, me-lo'. Mılrei, mil-ra'. Miltiades, mil-te'a-das or mil-tī'a-dēz. Mimamsa, mè-mam'sa. Mimulus, mim'ūl-us. Minas Geraes, mē'nas zhāra'es. Mincio, min'chi-o. Mindanao, min-dan-a'o. **Mineo,** min-a'o. Minervino Murge, mi-nervě'no moor'iš. Minghetti, min-get'ti. Mingrelia, min-grel'i-a. Minho, mi'nyo. Minie, mē-ni-ā' Minich, me'ni-ya. Minucius Felix, min oosh'i-us fē'liks. Minusinsk, mi-noo-sinsk'. Minyæ, me'nu-å or min'i-ë. Miocene, mi'ô-sēn. Miquelon, mē-k'lon'. Mir, mēr. Mirabeau, mē-ra-bo'. Miraj, mê-raj'. Miramichi, mi-ra-mi-she'. Miranda, mē-ran'da. Mirandola, mē-ran'dō-la. Mirgorod, mēr-go-rod'. Mirim, mi-rem'. Miropole, mê-ro-pol'yā. Mirza, mēr'za. Mirzapur, mēr-za-poor'. Miseno, mē-sā'no. Misereres, miz-er-ēr'ēs. Misilmeri, mi-sil·mā'ri. Misiones, mi-si-on'as. Missolonghi, mis-so-long'i. Mistassini, mis-tas-se'ni. Mistretta, mis-tret'ta. Mitau, më'tou. Mithras, me'thras. Mithridates, mith-ri-da'tās or mith-ri-da'tez. Mitla, mit'la. Mitrovitsa, mi-tro-ve'tsa Mitscherlich, mich'er-lich. Mittweida, mit'vī-da.

Meissen, mis'en.

Appendix of Pronunciation.

Mjösen, mye'sen. Mlawa, m'la'va. Mnemosyne, ne-mos'in e. Moa, mo'a. Mocha, mok'a or mo'cha. Mòd, mòd. Modica, mo'di-ka **Modjeska,** mõ-jes'ka. Mödling, med'ling. Modocs, mõ'doks. Modugno, mo-doo'nyo. Modulus, mod'ül-us. Möen, me'en. Moeris, me'ris or mer'is. Mœsia, me'si-a or mē'shi-a. Mofussil, mo-fus'sil. Mogador, mog-ad-or'. Mogdishu (Magadoxo), mog-de'shoo or ma-gadô'sho. Mogila, mo-he'la. Mogilev, mo-he'lyof. Moguer, mo-gar'. Mohammera, mo bam'mara. Moharram, mo-bar'ram. Mohl, môl. **Möhler**, me'ler. Mohn, mön. Moidore, moi-dor'. Moiræ, moi'rā or moi'rē. Moiré, mwa-ra'. Moissac, mwa-sak' Moissan, mwa-san'. Moji, mô'jee. Mojos (Moxos), mo'hos. Mokaddasi, mo-kad'da-si. Mokha, mo'cha. Mokshani (Mokshansk), mok-sha'ni (mokshansk') Mola di Bari, mô'la di ba'ri. Molbech, mol'bech. Moldau, mol'dou. Molé, mo la'. Mole St. Nicolas, mol san nē-kō-lä'. Moleschott, möl'es-chot. Molfetta, mol-fet'ta. Molière, mò-li-ar'. Molina, mō-lē'na. Moline, mo-lên'. Molinier, mo-lan-i-a'. Molinos, mō-le'nos. Mollendo, molyen'do. Möller, mel'ler. Mollymauk, mol-li-mak'. Molokai, mo-lo-ki'. Molteno, mol-te'no or moltā'no. Moltke, molt'ka. Moluccella, mol-ù-sel'la. Molybdenum, mo lib'denum. Molyneux, mol'in-ū mol'in-iks. Molza, mol'tsa. Mombasa, mom ba'za. Mome:n, mo-min'. Mommson, mom'sen, Momordica, mō-mor'di-ka. Momostenango, mô-môsten'ang-o.

Mompos, mom'pôs. Monaco, mon'a-ko. Monastir, mon-as-ter'. Moncalieri, mon-ka-li-ā'ri. Monchique, mon-shë ka. Mondonedo, mon do nya do. Mondovi, mon-dô'vi. Monera, mon'er-a. Monet, mo-na'. Monge, monzh. Monghyr, mun gir'. Monica, mô'ni-ka. Monitour, mo-ni-ter'. Monoceros, mon-os'er-os. Monochmtum, mon-ō-kō'tum. Monochlamydess, mon-ôklam-id'e-ē. Monod, mō-nō'. Monœcious, mon-esh'i-us. Monongahela, mon-on-gahē'la Monophysites. mon-ō-fī'zīts. Monotheletes, mon-oth'elīts or mon-ō-thel-ā'tās. Monotremata, mon-ô-tre'ma-ta. Monreale, mon-rā-a'lā. Monrovia, mon-ro'vi-a. Mons, mons. Monserrat, mon-ser-rat'. Monsignore, mon-si-nyo'ra. Monsonia, mon-so'ni-a. Montagnana, mon-ta-nya'na. Montagnards, mon - tanvar'. Montaigne, mõn-ta'ny' or mon-tan'. Montalembert, mõn-ta-länhār'. Montana, mon-ta'na. Montanelli, mon-ta-nel'li. Montargis, mon-tar-zhē'. Montaubin, mon-to-ban'. Montbáliard, mon-ha-liard' Montorison, mon-bre-zon'. Montcalm, mon-kam'. Montceau-les-mines, monsò-lā-mēn'. Montclair, mon-klar'. Mont-Dore-les-Bains, mondor-la-bans'. Montebello, mon-tā-bel'lo. Monte Carlo, mon'ta kar'lo. Montecatini. mon-tā-katë'ni. Montecuculi, mon-ta-koo'koo-li. Montefiascone, mon-ta-fias-ko'nā. Montefiore, mon-tā-fi-ō'rā. Monte: rio, mon-tā-frē'o. Montégut, môn-tā-gū'. Monteleone,mon-tā-lā-ō'nā. Montélimar, mon-ta-lemar'. Montelius, mon-tel'i-oos. Montemayor, mon-ta-mayōr'. Montenegro, mon-ta-ne'gro.

Montenotte, mon-tă-not'tă. Montereau, mon-t'ro'. Monterey, mon-tá-rá'. Monte Sant' Angelo, mon'tā sant an'iel-o. Montespan, mon-t's-pan'. Montesquieu, mon-t's-kye'. Monteverde, mon-tā-ver'dā. Montevideo, mon-ta-ve'a.āh Montexuma, mon-tá-dzoo'-Montferrat, mont-fer-rat'. Montfleury, mon-fle-re'. Montholon, mon-to-lon'. Monti, mon'ti. Monticelli, mon-ti-chel'li. Montignies - sur - Sambre, mon-te-nye-sur-san'br'. Montilla, mon-ti'lya. Montluc, mon-luk'. Montlucon, mon-lu-son', Montmartre, mon-mar tr'. Montpelier, mont-pel'yer. Montpellier, mon pel-li-a'. Montpensier, mon - panai-ā'. Montreuil-sous-Bois, monrey-soo-bwa'. Montreux, mon-tre'. Mont St. Michel, mon san më-shel'. Montserrat, mont-ser-rat'. Montyon, môn-yōn'. Monza, mon'sa. Mooruk, moor'ook. Moquegua, mo kā'gwa. Moradabad, mo-rad-a-bad'. Moræa, mor-e'a. Morales, mo-ra'las. Morat, mō-rat'. Moratalla, mô-ra-ta'lya. Moratin, mô-ra-tên'. Morbihan, mor-bi-an'. Mordvins, mord vinz. Morea, mo-ra'a or mor-e'a. Moreau, mó rô Morelia, mô-ra'li-a. Morella, mō-re'lya. Morelli, mō-rel'li. Morelos, mo-ra'los. Morena, mö-ra'na. Moreri, mō-rā'ri. Moresnet, mô-res-na'. Moreto y Cabana, mô-ra'to y ka-ba'na. Moretto, mo-ret'to. Morgagni, mor-ga'nyi. Morgarten, morgar-ten. Morghen, mor gen. Morgue, morg. Moricandia, mor-i-kan'di-a, Mörike, mer'i-ka. Morina, mō-rin'a. Morinda, mō-rin'da. Moringa, mō-rin'ga. Morinus (Morin), mō-rē'noos (mô-ran'). Morioka, mô-ri-ô'ka. Moriscos, mō-ris'kōs. Morlaix, mor-la'.

Moroni, mo-ro'ni.

Mortara, mor-ta'ra.

Mosasaurus, mo-sa-sa'rus. Mosaylima, mō-sī'li-ma. Moscheles, mosh''l az. Moschus, mos'choos mos'kus. Moselle, mo-zel'. Mosheim, mos'him. Mossamedes, mos-sa-ma'dās. Mostaganem, mos-ta-ganem'. Mostar, mos-tar'. Mosul, mos'ool. Motanabbi, mo-ta-nab'bi, Motmot, mot'mot. Moulins, moo-lan Mouscron, moos'krôn. Mousquetaires, moos-k'tār'. Moyobamba, mo-yo-bam'-Mozambique, mô-zam-bêk'. Mozarabes, moth-ar-ab'ez or mos-ar-abz'. Mozart, möz'art. Mozdok, moz-dok'. Mozir, mo-zer'. Mtzensk, m'tsensk'. Mtzkhet, m'tschet'. Muanza, mwan'za. Mudgee, mud'je. Mudki, mud'ki. Muchlinbeckia. mü-lenbek'i-a. Muezzin, moo-ed'zin. Mühlberg, mül'berg. Muhlenberg, mool'en berg. Mühlhausen, mül-hou'zen. Mülhausen, mül-hou'zen. Mülheim, mul'him. Mullah (Mollah), mool'la (mol'la). Mullein, mul'en. Müllenhoff, mül'len-hof. Müller, mül'ler. Mullingar, mul-in-gar'. Multan, mool-tan' Mummius, mum'i-us. Mun, mun. Munch, moonch. Münchhausen.münch-hou'zen or munk-hou'zen. Muncie, mun'sē. Münden, mûn'den. Munich (München), mun'ich (mün'chen). Munkacsy, moon-kachy''. Munku Sardyk, moon'koo sar-děk'. Münster, mün'ster. Muntjac, moont'jak. Münzer, mun'tser. Munzinger, moon'tsing-er. Muong-Nai, mwong-ni'. Muong-Pai, mwong-pi' Muong-Pan, mwong-pan'. Muræna, mü-re'na. Murano, moo-ra'no. Murat, mū-rä'. Muratori, moo-ra-tô'ri. Muraviev, moo-ra-vi-ef'. Muret (Muretus), mū-rā (moo-rā'toos):

Murex, mur'eks. Murger, mūr-zhā'. Murghab, moorg-ab'. Muridæ, mūr'id-ē. Murillo, moo ri'lyo. Murman, moor man. Mufner, moor ner. Murom, moo'rom. Murree, mur'ri. Mürren, mar'ren. Murshidabad, moor-shedä-bad'. Murtoza, moor-tō'za. Murzuk, moor-zook'. Musaceæ, moos-a se-ë. Musæus, moo-sa'oos mūz-ė'us. Musca, moos'ka. Musca Volitantes, moos'kā vol-it-an'tās or mus'se vol-it-an'tëz. Muscardine, mus'kar-dên. Muscari, mus-kā'ri. Muscat, mus'kat. Muscatelle, mus-kat-el'. Muscatine, mus-kat-ën'. Muschelkalk, moosh'elkalk. Muskegon, mus-ke'gon. Muskhogeans, mus-kō-je'anz. Muskoka, mus-kō'ka. Mussænda, mus-sên'da. Mussafia, moos-sa'fi-a. Musset, mūs-ā'. Mussooree, moos-soo'ri. Mustelidæ, mus-tel'id-ē. Mutisia, mū-tēs'i-a. Muttra, mut'ra. Muzaffargarh, muz-af-fargur'. Muzaffarnagar, muz-affar-nug'ur. Muzaffarpur, muz-af-farpoor'. Muztagh-ata, mooz-tag-a'-Mweru (Moero), mwa'roo (mō ēr'ō). Myaung - mya, mi-oung'mī-a. Mycale, mē'ka-lā. Mycense, mī-sēn'ē. Mycensean, mi-sen-e'an. Mydriasis, mī-drī'as-is. Myelitis, mī-el-īt'is. Myingyan, mi-ing-yan'. Myitkyina, mī-it-kī'in-a. Mylitta, mű-lit'ta. Myna, mī'na. Myosin, mī-ōs'in. Myosis, mī-ös'is. Myrcia, mirsi-a. Myrica, mi-rī'ka. Myrmidones, mir-mid'on-ÃX. Myrobalan, mir-ob'al-an. Meron, mû'rôn or mir'on. Myrrhis, mīr'is. Myrtaces, mir-ta'se-ē. Mysia, mū'si-a or mī'si-a. Mysis, mīs'is.

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Mytens, mi'tens. Naumachia, or nou-māk'i-a. Mytho, mi-to'. Mytilini, mi-ti-lēn'i. Myxœdema, miks-oi-dêm'a. Navajoes, nav'a-hôz. Myxomycetes, miks-o-mi-Navarino, na-va-re'no. sēt'ēz. Navarre, na var'. Navew, na'vů. Naas, nās. Naba, nā'ba. na (nuzr). Nabatmans, na-ba-te'anz. Neagh, ná. Nabha, nab'ha. Neanderthal. Nablus, nab-loos'. täl'. Nachod, nach'od. Neapolis, ne-ap'ol-is. Nachtigal, nach'ti-gal. Nadaillac, na di yak'. nē-ar kus. Nadiya, nud'i-a or nud-ë'-Necrosis, nek ro'sis. VA. Nadol, na-dôl'. Nægelia, nä-gel'i-a. Naestved, nast'ved or nest'sem-bil-an' ved. Nævius, nā'vi-oos or nēv'ito (neg-ri⁷lyo). us. Negros, na gros. Näfels, nå'felz. Negruzzi, nā-groot'si. Nagane, na ga'no. Negundo, neg-un'do. Nagasaki, na-ga-sa'ki. Negus, ne'gus. Nägeli, ná'gel-i. Neisse, nīs'a. Nagoya, na-gō'ya. Nélaton, nā-la-toņ'. Nagpur, nag-poor'. Nemathelminthes. Nagy-Banyd, nody bon'yo. ath-el-min'thez. N. Karoly, ko-rō'iy', N. Körös, ke-resh'. Nahuatl, na-wa't'l. Nemertea, nem-er'ti-a. Naihati, ni-ha'ti. Nemesia, nem-e'si-a. Naini Tal, ni-ni-tal'. Nemi, na'mi. Nairobi, nī-rô'bi. Nemours, n'moor'. Najibabad, na-jib-a-bad'. Nakhichevan, na-chè-chevän'. Nakskov, naks-kov' or nas'kov. Namangan, na-man-gan'. Neozoic, ne-o-zô'ik. Namaqua, na-ma'kwa. Nam-dinh, nam-diny". Nepal, ne-pal'. Namur, na-mur' Nanaimo, na-nī'mo. Nepeta, nep-et'a. Nana Sahib, na'na sa'hib. Nan-chang-fu, nan-chang-Neparitis, nef-rīt'is. foo'. Nancy, nan-se'. Nandair, nan-dar'. Nandgaon, nand-ga'on. Nérac, na rak'. Nan-king, nan-king'. Nerchinsk, ner-chinsk'. Nereids, ner-ē'idz. Nan-ning-fu,nan-ning-foo'. Nan-shan, nan-shan'. Nereis, ner'i-is. Nereus, ner'i-us. Nanterre, nan-ter'. Nergal, ner'gal. Nantes, nänt'. Naoroji Dadabhai, na-o-ro'-Neri, na'ri. ji da-da-b'hi'. Nerine, ner-în'ē. Nerium, ner'i-um. Narainganj, na-rān-gunj'. Narandera, na-ran-dé'ra. Nerval, nar-val'. Narbada, nur-bud'a. Narsinghgarh, nur-singgur'. brand'en-boorg. Narsinghpur, Neuchâtel, ne-shat-el'. nur-singpoor'. Narvaez, nar-va'eth. frī'a pres'sa. Neuhaus, noi'hous. Nashua, nash'u-a. Nasirabad, nus-ēr a-bad'. Natrolite, nat'ro-lit. ดบั**ร**-สลิก Naucratis, nou'kra-tis.

Naugatuck, nou-ga-tuk'.

Nauheim, nou'him.

nav-ma ki-a Naumburg, noum'boorg. Nazrana (Nazar), nuz-ra'nå-an-der-Nearchus, nā-ār koos or Neerwinden, nar'vind-en. Negapatam, neg-a-put-am'. Negri Sembilan, nag'ri Negrito (Negrillo), neg-re'nam. Nematodes, nem'a-tôdz. Nemea, ne-mā'a or nem-ê'a. Neodymium, nē-ō-dē'mi-Neoptolemus, ne-op-tol'em-Neo-Pythagoreanism, něo-pī-thag-or-ē'an-izm. Nepenthes, nep-en'thes. Nephoscope, nef'ō-sköp. Nephrodium, nef-rod'i-um. Nephrolepis, nef-ro-lep'is. Nepos, na pos or nepos. Nesselrode, nes'sel-rod-a. Neubrandenburg, noi-Neue Freie Presse, noi'a Neuilly-sur-Seine, ne-i-ye-Neumünster, noi-mun'ster. Neunkirchen, noin'kirchen.

Neu-Pommern, noi-pom'-Neuruppin, noi-roop'pen. Neusalz, noi'zals, Neu-Sandec, noi-san'dets. Neusatz, noi zats. Neusiedler See, noi'zēd-ler zá. Neusohl, noi'zōl. Neustadt, noi'stat. Neustrelitz, noi-stral'its. Neutitschein, noi'tit-shīn. Neuville, ne-vel'. Neuwied, noi'vēd. Nevers, n'var'. Nevski Prospekt, nev-ski' pros-pekt'. Nevyanskii Zavod, nevyan'ski zav-od'. Newchwang, nu-chwang'. Nez Percés, na par-sa'. Ngami, nga'mi. Ngan-ching, ngan-ching'. Ngan-hwei, ngan-hwa'. Ngornu, ngor noo. Niam-niam, nyam-nyam'. Nias, ni-as'. Nibelungenlied, ne-beloong'en-led. Nicæa, nī-sē'a. Nicander, ni-kan'der. Nicaragua, nik-ar-a'gwa. Niccolini, nik-kō-lē'ni. Nicias, ne'ki-as or ni'si-as. Nicolai, ni-ko-li'. Nicolaitans, nik-ol-a'it-anz. Nicole, ni-kol'. Nicomedia, ni-kō-mā'di-a or ni-kô-mê'di-a. Nicopolis, ni-kop'ol-is. Nicosia, ni-kô'si-a Nicotera, ni-kō-tā'ra. Niebuhr, në'boor. Niederwald, ne'der-valt. Niello, ne-el'lo. Niemen, në'men. Niemes, ni-ām'es. Niepoe, ni-eps'. Nierembergia, ner-em-ber'ji-a. Nierstein, nër stin. Nietzsche, net sha. Nièvre, ne av'r'. Nigdeh, nig'dā. Nigella, ni-jel'la. Nigra, në gra. Niigata, ni-i-ga'ta. Nijnii-Novgorod, nizh'nënov-gö-rod'. Nike, në'ka or ni'ke. Nikolsburg, në'kols-boorg. Nikopoli, nik-op'ol-i. Nilgai (Nilghau), nil-gī' (nil-gou'). Nilgiri, nil gë'ri. Nimeguen, nim'a-gen. Nîmes, něm. Niobe, në o-ba or ni o-be. Niort, ne-or'. Nipigon, nip'ig-on. Nippon Yusen Kaisha. nip'pon yoo'sen kī'sha. Nirvana, nir-va'na.

Appendix of Pronunciation.

Nisard, në-sar'. Niscemi, nis-shā'mi. Nishapur, nish-a-poor'. Nisibis, nis'ib-is. Nisi Prius, ni'si pri'us. Nitella, nit-el'la. Noailles, no i'y Noctiluca, nok-ti-lū'ka. Nodier, no-dyā'. Nogent, no-zhan' Noisseville, nwas'věl'. Nöldeke, nel'da ka. Nonse, no na or non e. Nopalea, no-pāl'i-a. Norbert, nor-bar'. Nordau, nor-dou'. Norddeutscher, nord-doi'cher. Nordenskiöld, nord'enskeld. Norderney, nor'der-nL Nordica, nor'dik-a. Noricum, nor'ik-oom. Norrköping, nor'chep-ing. Nostoc, nos'tok. Nostradamus, nos-tra-da'moos or nos-tra-dam'us. Notelæa, not-el-e'a. Nothoclæna, noth-ö-kle'na Nothoscordum, noth-ôskor'dum. Nototherium, not-o-ther'i-Noumenon, nou'men-on. Nouvelle Revue, noo-vel' r'vů'. Novaliches, no-va-le'ches. Novalis, nô-va'lis. Novatus, nov-āt'us. Novaya Zemlya, nö'vä-ya zem'lya. Novelda, no-vel'da. Novgorod, nov-go-rod'. N. Syeversk, sya versk'. Novibazar, nō-vi-ba-zar'. Novikoff, nov'i-kof. Novo-Cherkask, no vo-cherkask'. N. Georgievsk, ge-or-gievsk'. Novograd-Volinski, no'vograd-vol-in'ski. Novo - Moskovsk. ກຄ້າທmos-kovsk'. N. Radomsk, rad-omsk'. N. Rossiisk, ros-sisk'. Nowgong, nou-gong'. Noya, no'ya. Noyades, nwa yad'. Noyeau, nwa-yo'. Noyon, nwa yon'.

Nuevo Leon, nwā'võ lā-ŏn'. Nukha, noo'ka. Numa Pompilius, noo'ma pom-pil'i-us. Numantia, noo-man'ti-a or nūm-an'shi-a. Nummulites, num'ūl-īts. Nunez de Arce, noo'neth dā ar'thā. Nurragghi, noo'ra-gi. Nusle, noos'la. Nyangwe, nyang-wa'. Nyasa, nyäs'a. Nyborg, nu'bor. Nyctaginaces, nik-ta-ginā'se-ē. Nycteribia, nik-ter-ib'i-a. Nykjöbing, nū-chye'bing. Nyköping, nu'che-ping. Nymphæa, nim-fe'a. Nystad, nu'stad. Oamaru, ō-a-ma-roo'. Oas, o as'. Oaxaca, wa-ba'ka. Oberalp, o'ber-alp. Ober - Ammergau, ô'heram'mer-gou. Oberhausen, ö'ber-houz-en. Oberonia, ob er-ou'i-a. Oberstein, ö'ber-stin. Oboyan, ö-bö-yan'. Ocampo, ō-kam'po. O'Carolan, ō-ka'rō-lan. Oceanus, ö-sē'an-us. Ocelot, os'el-ot. Ochiali (Ali el-Uluji), ō-kia'li (a'li el-ool-oo'ji). Ochino, ō-kē'no. Ochrida, ok'ri-da. Ocimum, ō'si-mum. Octomeria, ok-tō-mēr'i-a. Octroi, ok-trwa'. Odenathus, ō-den-ath'oos or ō-den-āth'us. Odenkirchen, ō'den-kirchen. Odense, ô'den-sa. Odenwald, o'den-valt. Odrum, ō-dē'um. Odi (Woden, Wuotan), o'din (wo'den, wô'tan). Odoacer, od-o-a'ker or odō-ā'ser. Odontopteryx, ōd-on-tōter'iks. Odontornithes, o-dont-ornī'thēz. Odontospermum, ōd-on-tōsper'mum. Odysseus, o-dis'us.

Œcolampadius, oi-ko-lam-

pa'di-oos.

Œdema, ë-dêm'a.

Œdenburg, e'den-boorg. Œdipus, oi'di-poos or ēd'ip-us. Œdogonium, ēd-ō-gōn'i-um. Œnocarpus, ēn-o-kar'pus. Œnomaus, oi-no'ma-oos. Œnomel, ēn'o-mel. Œnone, oi-nô'nā or ēn-ōn'i. Œnophyta, oi-no-fū-ta or oi-nō-fī'ta. Enothera, ēn-oth'er-a. Ersted, er'sted. Oesel, ez'el. Œsophagus, ēs-of'ag-us. Œtinger, et'ing er. Ofterdingen, of ter-ding-en. Ogaden, og-ad-en'. Ogdensburg, og'dens-boorg. Ogowai, og'ö-wä. Ogyges, ō-gû'gās or ō-gī'jēs. Ogygia, ō-jij'i-a. Ohlau, o'lou. Ohlendorffia, ö-len-dorf'i-a. Ohler, ö'ler. Ohm, öm. Ohnet, o.na'. Ohrwalder, or'vald-er. Oidium, o-id'i-um. Oise, waz. Okapi, ō-ka'pi. Okayama, ō-ka-ya'ma. Okofinokee, ō-kef-in-ōk'ē. Okhotsk, ō-chotsk'. Oklahoma, ōk-la-hô'ma. Okuma, ō-koo'ma. Oland, o'land. Olbers, ol'barz. Oldenburg, ol'den-boorg. Olean, ol-i-an'. Olearia, öl-i-ar'i-a. Olenek, öl-an-ek'. Olenus, öl-en'us. Oléron, ō la-ron'. Olibanum, ol-ib'an-um. Oligocene, ol·ig-o-sen'. Olivenite, ol'iv-en-it. Olivenza, ō-liv-en'tha. Olivetans, ol-iv'et-anz. Olivier, ō-liv-ē-ā'. Olla Podrida, o'lya pod-re'da. Olmütz, ŏl'mūts. Olonets, ol-on'ets. Oloron, ol-or-on'. Omahas, o'ma-houz, Oman, ō-man'. Omar Khayyam, ô'mar chi-yam'. Omdurman, om-door-man'. Ommiades, om-mi'ad-ez. Omphacite, om'fa-sit. Omphale, ôm'fa-lā or ôm'fa-lē. Omphalea, om-fal-ē'a.

Omphalodes, om-fal-öd'ēs, Onager, on a j-er. Onagracese, on-ag-ra'se-ê. Onega, čn-ā'ga. Oneglia, on-e'lya. Onehunga, on-ā-hun'ga. Oneida, on-i'da. Ongaro, on ga-ro. Onkilon, on kil-on. Onobrychis, ō-cob'fiz-is. Onoclea, on-ok-lê'a. Onomacritus, on-om-ak'rit-us. Onomatoposia, on-om-at-opē'i-a. Onomichi, ön-om-ē'chi. Ononis, on on'is. Onopordon, on op-or'don. Onosma, on-os'ma. Ontentiente, on-ten-ti-en't.ā. Onus Probandi, on'us proban'di. Oogonium, ō-ō-gōn'i-um. Colite. o'o-lit. Oosterhout, ös'ter-hout. Oosterzee, ōs'ter-zā. Opata-Pima, ö-pa'ta-pē'ma. Opercularia, op-er-kū-lār'i-a. Ophicleide, o.'ik-lid. Ophioglossum, of-i-o-glos'um. Ophiopogon, of-i-op'og-on. Ophir, o'fir. Ophiuchus, of-i-u'kus. Ophrys, of ris. Opimius, ô-pe'mi-oos. Opopanaz, op-op'an-aks. Oporto, ō-pōr'to. Oppeln, op'peln. Oppenheim, op'pen-him. Oppert, op-par'. Oppianus, op-pi-an'oos or op-pi-an'us. Opuntia, op-un'shi-a. Orach, or ach. Oræfa Jökull, ö-ra'fa ye'kool. Orakzais, ör'ak-zāz. Oran, o-ran'. Orbigny, or-be-nyi'. Orbilius, or-bê'li-oos, Orcagna (Arcagnolo), orka'nya (sr-ka-nyo'lo). Orchha, or'ch'ha. Orchomenus, or-kom'en-OOS. Orcin (Orcinol), or'sin (or'sin-ol). Ordericus Vitalis, or-derēk'oos vit-al'is. Ordovices, or-do-we'kas or

or-do-vi'ses.

Nueces, nwä-ä'sez.

Nuevitas, nwa-ev'it-as.